MONTHLY WEATHER REVIEW.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for September, 1905, is based on data from about 3495 stations, classified as follows:

Weather Bureau stations, regular, telegraph, and mail, 176; West Indian Service, cable and mail, 13; River and Flood Service, regular 52, special river and rainfall, 363, special rainfall only, 98; cooperative observers, domestic and foreign, 2565; total Weather Bureau Service, 3267; Canadian Meteorological Service, by telegraph and mail, 33; Meteorological Service of the Azores, by cable, 2; Meteorological Office, London, by cable, 8; Mexican Telegraph Company, by cable, 3; Army Post Hospital reports, 18; United States Life-Saving Service, 9; Jamaica Weather Service, 130; Costa Rican Meteorological Service, 25. Total, 3495.

Since December, 1904, the Weather Bureau has received an average of about 1700 reports from as many observers and vessels, giving international simultaneous observations over the Atlantic and Pacific oceans at 12 noon, Greenwich time, or 7 a. m., seventy-fifth meridian time. These are charted, and, with the corresponding land observations, will form the framework for daily weather charts of the globe.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. S.I. Kimball, General Superintendent of the United States Life-Saving Service; Capt. H. M. Hodges, U. S. N. (Retired), Hydrographer, United States Navy; Anastasio Aljaro, Director of the Physico-Geographic Institute, San José, Costa Rica; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Secretary, Meteorological Office, London; H. H. Cousins, Chemist, in charge of the Jamaica Weather Office; Señor Enrique A. Del Monte, Director of the the Meteorological Service of the Republic of Cuba; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

Attention is called to the fact that at regular Weather Bureau stations all data intended for the Central Office at Washington are recorded on seventy-fifth meridian or eastern standard time, except that hourly records of wind velocity and direction, temperature, and sunshine are entered on the respective local standards of time. As far as practicable, only the seventy-fifth meridian standard of time, which is exactly five hours behind Greenwich time, is used in the text of the REVIEW. The standards used by the public in the United States and Canada and by the cooperative observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is 157° 30′, or $10^h\ 30^m$ west of Greenwich. The Costa Rican standard meridian is that of San José, $5^h\ 36^m$ west of Greenwich.

Barometric pressures, whether "station pressures" or "sea-level pressures", are now reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

In conformity with Instructions No. 43, March 29, 1905, the designation "voluntary", as applied to the class of observers performing services under the direction of the Weather Bureau without a stated compensation in money, is discontinued, and the designation "cooperative", will be used instead in all official publications and correspondence.

Hereafter the titles of the respective forecast districts will be as used in the current REVIEW to accord with paragraph 236 of Station Regulations, dated June 15, 1905.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

Three barometric depressions of moderate intensity influenced the weather of portions of the British coasts during the first and third decades of the month. From the 7th to 10th a depression remained nearly stationary near the north coast of Scotland and then moved slowly eastward to Scandinavia. From the 22d to 26th and 27th to 30th depressions advanced from off the south coast of Ireland to continental Europe. In the vicinity of the Azores the barometer continued comparatively high, except on the 20th, when it fell to 29.82 at Horta, Fayal, with a maximum wind velocity of 30 miles per hour from the southwest. The depressions that passed over the Atlantic from the American Continent were of small intensity.

On the morning of the 6th a disturbance of apparent small diameter appeared to the eastward of Barbados, West Indies; during the afternoon of that day it passed to the westward of Barbados, and by the morning of the 7th had advanced into the eastern Caribbean Sea. The severity of this storm is indicated by the experience of a schooner that sailed from Bridgetown on the morning of the 6th bound for Surinam. When 40 to 50 miles from port the voyage was abandoned on account of heavy seas and high squally winds, and the vessel returned to Bridgetown where it was thrown by heavy seas on the pierhead and totally wrecked, with the loss by drowning of the captain and one of the crew. Advices were issued to West Indian ports regarding the character and probable course of this disturbance on the 6th and 7th. After the 7th it appeared to drift slowly westward over the Caribbean Sea as a shallow depression of considerable area in which no evidence of high winds has been furnished.

The most important storm of the month in the United States occurred over the upper Lake region during the 2d and 3d, attending the passage of low area I; on the north Pacific coast on the night of the 25th; and on the middle coast of the Gulf of Mexico from the 26th to the 30th, attending low area XII. On Lake Superior, damage to shipping and loss of life attended the storm of the 2d and 3d. Damage of a minor character only was caused by the north Pacific storm, and no serious damage has been reported in connection with the Gulf storm. The passage of low area I was attended by severe thunderstorms and rainstorms in the upper Mississippi and lower Ohio valleys and the western Lake region, and by

exceptionally heavy rains in New York and New England. On the 9th and 10th violent electrical and rainstorms prevailed throughout the Southwest, in connection with low area II, and in Missouri and Oklahoma and Indian Territories small streams were flooded and damage was caused to property. From the 13th to the 15th heavy rainstorms and high winds occurred in the lower Missouri Valley and heavy rains during the succeeding three days caused floods in the smaller streams of eastern Kansas and Missouri that flooded thousands of acres of corn fields in bottom lands. Flood stages for which warnings were issued occurred in the Missouri River east of Kansas City, and in the middle Mississippi River south of the mouth of the Missouri.

Frosts occurred in Missouri and Wisconsin on the 13th and in Michigan and New York on the 14th. High wind during the night of the 13–14th is reported to have saved the Cape Cod cranberry crop from destruction by heavy frost. On the morning of the 14th frost was forecast for the morning of the 15th in the cranberry bogs of New Jersey and considerable damage by frost is reported to have been caused, the morning of the 15th, to cranberries in some parts of the New Jersey district.

Snow was reported in the mountain districts of Vermont on the 13th, in the Adirondacks on the 15th, and in the mountains of Colorado on the 18th. Six inches of snow was reported on Mount Washington on the 25th.

BOSTON FORECAST DISTRICT.

The month, as a whole, was wet and cool. (The average rainfall for the month was 5.41 inches, having been exceeded in September but once, viz, in 1884, when an average rainfall of 8.29 inches was reported.) Light to killing frosts were quite general on the 15th and 27th, and in many sections of the Northern States the temperature fell to freezing or below. Frost warnings were issued to cranberry growers on the 14th and 27th. Reports received from the growers showed temperatures ranging from 26° to 29°, with moderate to heavy frosts in the 15th in the bogs. On the 27th frost was general, with temperatures from 24° to 26° on the bogs. The warnings were timely and of benefit to cranberry interests.—*J. W. Smith, District Forecaster.*

CHICAGO FORECAST DISTRICT.

The storm from the southwest reached Lake Michigan by the morning of the 2d, and then passed very slowly eastward, causing brisk to high winds. Several wrecks occurred on Lake Superior, the principal one being that of the *Servona*, a large steamship, the master of which mistook the Raspberry Island light for that of the Sand Island light and consequently ran upon the reef. The only other storm of consequence reached the Lake region on the morning of the 19th, and passed thence to the northward of Lake Superior without causing any material damage.

Frost warnings were issued for the lowlands of Minnesota and Wisconsin on the 2d, 3d, 4th, and 5th in advance of the cold weather which overspread the Northwest, but the weather continued cloudy and the temperature did not quite fall to the frost point in the States specified. Special attention was given to the prediction of frost in the cranberry marshes of Wisconsin, and the predictions of frost for the balance of the month were completely verified. Warnings were issued on the 12th, and they were followed by a minimum temperature of 26° and 30° at Mather and Grand Rapids, Wis., respectively; again on the 22d the warning was followed by freezing temperature on the marshes. Warnings on the 24th preceded low temperatures over the entire upper Lake region. The minimum in the marshes near Grand Rapids fell as low as 22°.—*H. J. Cox, Professor and District Forecaster.*

LOUISVILLE FORECAST DISTRICT.

There were no marked disturbances during the month. The weather was mostly dry and warm, with a few scattered rain periods of short duration and one cool spell from the 3d to the 7th and on the 26th on which latter date light frost occurred in the eastern part of Kentucky.—*F. J. Walz, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.

Weather conditions were moderate until the 26th, when a general low pressure area appeared in the Gulf of Mexico. From the 26th to the evening of the 28th the disturbance was apparently moving from the central Gulf toward the northwest, and on the morning of the 29th the storm-center moved into Louisiana. Although the storm did not exhibit specially severe features, high winds and high tides prevailed along the central Gulf coast, and shipping remained in port until advised by the Weather Bureau that danger had passed. Public opinion is that the warnings prevented much damage. The New Orleans Item of September 30, 1905, remarks in connection with this storm as follows:

> The warnings of the United States Weather Bureau have been, as usual, exceptionally accurate and timely. All shipping interests heeded the warnings and remained in port until advised that all danger had passed. In such instances the value of the warnings to the shipping and commercial interests can not be estimated. The money value of the property saved in such a case is doubtless greater than that expended in the operation of the Weather Bureau for an entire year. It is a noteworthy fact that no storms have occurred in recent years without timely warnings, so efficient has the weather service become in this work.

I. M. Cline, District Forecaster.

DENVER FORECAST DISTRICT.

The month was characterized by mild, pleasant weather. Timely warnings were issued for the sharp falls in temperature and killing frosts that occurred during the closing days, and for most of the light frosts that occurred earlier in the month.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.

The month was one of normal conditions and little rain fell, except in the southern portion of the State. On the 26th conditions were favorable for a rapid southerly movement of a depression over Washington; the movement was, however, along a line farther east than anticipated, in fact, on the eastern slope of the Sierra Nevada rather than on the western slope. Warnings were issued to raisin growers and others interested. Showers fell in the central valleys of California, but not along the coast. Rain fell in the southern mountains of California, and would have injured drying crops but for warnings sent on the 27th and night of the 28th.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND FORECAST DISTRICT.

The fall rains began in northwestern Washington on the 7th, and on the 12th showers and thunderstorms in western Oregon, Washington, and northern Idaho checked forest fires that had been burning for some time. During the last half of the month frost occurred frequently in eastern Oregon, eastern Washington, and Idaho, for all of which timely warnings were issued. Storm warnings for moderate gales were issued on the 16th, 19th, 25th, and 27th.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

The only feature of special interest in connection with the work of the River and Flood Service during the month was the flood in the Missouri River east of Kansas City, Mo., and in the Mississippi River from Alton to Cairo, Ill., a very unusual occurrence for the time of the year, and an absolutely unprecedented one with regard to the rapid rise of the water. The flood was not of great magnitude, but coming, as it did, at a time of the year when nothing but the usual seasonal decline was expected, it caused a considerable amount of damage to property that was thought to be secure from loss by water.

The flood was caused by the heavy rains from the 15th to

19th, inclusive, over eastern Kansas, Missouri, and southern Illinois, but especially over Missouri. At Boonville, Mo., 12.98 inches of rain fell during this period, while an immense amount of water also poured in from the tributaries from the Ozark Mountains. At Chester, Ill., there was a downpour on the 16th and 17th, 8.06 inches of rain falling in 20½ hours. The preliminary warnings of the flood were issued on the 16th and 17th, and these were followed on the 18th by specific warnings of danger-line stages. The following report of this flood was prepared by Mr. E. H. Bowie, Local Forecaster in charge of the U. S. Weather Bureau, St. Louis, Mo.:

Floods, unprecedented both for the season of the year and for the rapidity of the rising waters, occurred in the Missouri River and tributaries east of Kansas City and in the Mississippi River at St. Louis during the second decade of September, when all records for high water in the months succeeding July were broken for the stations at Boonville, Hermann, and St. Louis.

These floods had their inception in phenomenally heavy rains during the period from September 15 to 19, inclusive, and followed immediately after the downpour during the 24 hours ending at 7 a. m., September 17. The following table gives the daily rainfall during September 15–19 at a number of stations in the St. Louis district for the 24 hours ending at 7 a. m.:

Stations.	Date.				
	Sept. 15.	Sept. 16.	Sept. 17.	Sept. 18.	Sept. 19.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
Kansas City, Mo.	2.92	2.04	0.59	1.66	0.46
Osceola, Mo.	1.30	0.60	0.32	0.60	0.48
Albany, Mo.	0.18	0.70	0.90	3.00	0.50
Trenton, Mo.	0.97	2.00	1.34	0.45	0.79
Glasgow, Mo.	2.87	0.00	3.74	0.00	1.20
Jefferson City, Mo.	1.05	1.90	5.70	0.01	0.82
Boonville, Mo	2.34	1.46	6.70	1.70	0.78
Warrenton, Mo.	0.05	0.76	2.05	0.01	1.44
Hermann, Mo.	0.12	0.70	3.40	T.	1.52
Grafton, Ill.	0.04	0.00	1.97	0.73	8.00
St. Louis, Mo.	T.	T.	3.22	T.	0.25
Ironton, Mo.	T.	0.00	5.42	0.13	0.34
Arlington, Mo.	.....	.....	6.00	.....	.....
Chester, Ill.	0.00	0.00	8.06	0.00	0.22

During the 24 hours following the rainfall recorded at 7 a. m. of the 17th rapidly rising water prevailed in all of the tributaries of the Missouri east of Kansas City, and unprecedentedly rapid rises were reported from Boonville and Hermann. These floods washed away a number of bridges on the smaller tributaries and caused a suspension of railroad traffic for several days in the flooded district. A considerable loss of corn and other crops was also caused by the rapidly rising floods.

The Missouri reached a crest stage of 17.5 feet, or within 0.5 foot of the danger line, at Glasgow on the 20th, 22.0 feet or 2.0 above the danger line at Boonville, and 25.4 feet or 1.4 feet above the danger line at Hermann, on the same date. The crest of the flood wave passed St. Louis on the 21st, when the stage was 30.2 feet, or 0.2 foot above the danger line. The most rapid rise in the Missouri occurred during the 24 hours ending at 7 a. m. of the 17th, during which time the river rose 6.3 feet at Boonville and 9.5 feet at Hermann. At St. Louis the river rose 10.3 feet during the 24 hours ending at 7 a. m. of the 18th, which almost equals the record for rapidity of rise at this point. The greatest recorded 24-hour rise was that of 13.2 feet from January 3 to 4, 1897. Another great 24-hour rise was that of 9.3 feet from February 20 to 21, 1882.

The floods in the Mississippi River between Alton and Chester, aside from inundating bottom lands and destroying the corn crop thereon, caused little damage. At St. Louis previous to the time of the flood the levee was well covered with freight, but precautionary measures prevented loss, except in the cases of several shipments of goods that were piled near the water's edge.

On the morning of the 16th of September the Weather Bureau issued a forecast to the effect that the Missouri and tributaries east of Kansas City and the Mississippi at St. Louis would rise rapidly during the next three days, and on the following morning this forecast was repeated. On the 18th of September flood warnings were issued for the lower Missouri River and the Mississippi River between Alton and Chester. The warning stated that the river at St. Louis would approach the danger line by the night of September 20. The actual stage reached was 0 2 foot above the danger line on the 21st.

The following table shows the daily river stages and 24-hour changes from September 15 to 23, the latter date being the one on which the stage was below the danger line at St. Louis:

Date.	Boonville.		Hermann.		Grafton.		St. Louis.	
	Height.	Change.	Height.	Change.	Height.	Change.	Height.	Change.
September 15	8.8	+0.2	9.7	−0.4	8.2	−0.4	11.3	− 0.8
16	10.6	+1.8	11.2	+1.5	8.2	0.0	11.1	− 0.2
17	16.9	+6.3	20.7	+9.5	8.8	+0.6	12.9	+ 1.8
18	21.3	+4.4	24.3	+3.6	11.0	+2.2	23.2	+10.3
19	21.6	+0.3	25.4	+1.1	13.6	+2.6	27.1	+ 3.9
20	22.0	+0.4	25.4	0.0	15.6	+2.0	29.3	+ 2.2
21	21.3	−0.7	24.6	−0.8	16.4	+0.8	30.2	+ 0.9
22	19.5	−1.8	23.3	−1.3	16.2	− 0.2	30.1	− 0.1
23	17.9	−1.6	21.6	−1.7	15.2	−1.0	29.2	− 0.9

Warnings were also issued from Cairo, Ill., for the flood from below St. Louis, Mo., to Cairo, Ill. At Cape Girardeau, Mo., a stage of 30 feet, two feet above the danger line, was reached on the 22d. Considerable corn between Chester and Cairo, Ill., was either lost or injured, but there were no other losses of consequence.

The rivers of the other districts were comparative low, and nothing of more than ordinary interest was noted.

The highest and lowest water, mean stage, and monthly range at 270 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

CLIMATE AND CROP SERVICE.

By Mr. JAMES BERRY, Chief of Climate and Crop Divison.

The following summaries relating to the general weather and crop conditions during September are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau; they are based upon reports from cooperative observers and crop correspondents, of whom there are about 3300 and 14,000, respectively:

Alabama.—Generally favorable for maturing and gathering crops, though locally heavy to excessive rains caused some damage and slightly retarded harvesting. Cotton condition generally unsatisfactory, fruitage practically ceased by 15th; damage by rust, shedding, and boll rot ceased by about 20th, too late for crop to recover; bolls opened rapidly, many prematurely; crop about half gathered by close of month, indicating comparatively light yield. Corn and minor crops advanced well, continuing to make fairly good yields.—*F. P. Chaffee.*

Arizona.—The rainfall was in excess; temperature normal. Killing frost occurred in the mountain districts on the 18th and 30th. Grain harvest was completed in the north-central counties by the 15th; corn and alfalfa cutting in progress over the central section at the end of the month. The snowfall over the San Francisco range, measuring 2.0 inches, on the 29, was the earliest on record. Fruit and garden truck yielded well. There was an ample supply of water. Range feed deteriorated over the southwest. Stock generally healthy and fat.—*L. N. Jesunofsky.*

Arkansas.—Temperature and precipitation slightly above normal. Cotton deteriorated generally during the month; considerable damage by worms, rust, and shedding; opening slowly in some sections, more rapidly in others; picking more general, but not progressing very rapidly; at close of month amount picked ranged from 5 to 25 per cent. Early corn gathered, yield light, not up to earlier expectations; late corn doing fairly well, but will not make a full crop, total failure in some localities. Sweet and Irish potatoes doing well, having been benefited by rains last week of month. Apples all gathered; yield light, quality inferior.—*Edward B. Richards.*

California.—The temperature and rainfall were slightly below normal, but conditions were very favorable most of the month for ripening grapes and late fruits, raisin making, fruit drying, and general farm work. Light rains at intervals caused no damage, except to unprotected raisins and drying fruits in portions of the south. As a rule the weather forecasts were heeded, raisins were stacked, and the loss was nominal. The first snow of the season fell in the Sierra Nevada on the 23d.—*Alexander G. McAdie.*

Colorado.—Conditions were generally favorable, notwithstanding damaging frosts on the 18th and 19th in the south-central division and western valleys. Harvesting of grain was nearly finished; yield of small

grain was generally good, except that of spring wheat. Corn, sugar beets, and potatoes were generally promising, and at close of month corn cutting and beet pulling were under way in the north-central and eastern divisions, and the digging of potatoes had begun in the eastern counties.—*F. H. Brandenburg.*

Florida.—The average temperature during the month slightly exceeded the normal. The precipitation was in excess by half an inch. The weather conditions were unfavorable to cotton, the picking of which was delayed in northern counties. The persistent warm, dry weather in the western cotton counties caused a premature opening of bolls and a deterioration of the plants. The crop will be about two-thirds of an average one. Citrus trees made a vigorous growth; a few complained of fruit splitting, owing to frequent rain. Pineapple slips advanced very well. The corn and hay crops were very good. The fall planting of vegetables was somewhat backward.—*A. J. Mitchell.*

Georgia.—The month was warm, with light rainfall north, increasing southward, amounts varying widely for individual stations. Cotton opened rapidly, some prematurely; picking was pushed; two-thirds gathered in northern and three-fourths in central and southern sections at close of month; no top crop; small yield indicated; some injury by rust, shedding, and caterpillars. A fine crop of forage was saved. Minor crops were seriously injured by drought. Corn was being housed; crop fair to good. Very little fall plowing done.—*W. A. Mitchell.*

Hawaii.—Unsettled weather prevailed during the entire month, with temperature slightly below seasonal average and rainfall considerably above normal in nearly all sections; monthly precipitation totals in many localities (notably windward Hawaii) exceeded those of any other September during the past fifteen years. Growing cane made satisfactory progress, except in southern Hawaii, where the major portion of the month was dry. Excessive moisture seriously interfered with field operations in many windward plantations. Summer pineapple crop all harvested, and winter crop coming along nicely, with indications of fine yield. Coffee ripened rather slowly during month. Second crop rice grew well and that of earliest planting had already headed. Condition of pastures generally satisfactory.—*Alex. McC. Ashley.*

Idaho.—First of month warm and dry; latter part cooler, with good rains in northern counties and some scattering showers elsewhere. Haying, harvest, and gathering of all but the later fruits completed. Fruit below average. Fall wheat good; spring wheat poor to good; total above average. Beets somewhat disappointing. Late hay below average, owing to shortage of water. Corn badly eaten by worms. Other crops average.—*Edward L. Wells.*

Illinois.—Seeding of wheat was begun during the first decade in favored localities, but in many places the work was retarded on account of dry condition of soil. Ideal weather conditions obtained for maturing of corn and at the end of the month the crop was practically safe from injury by frost. A heavy yield of superior quality was indicated. Cowpeas, fall clover, and millet were being put up in good condition. The outlook for potatoes and apples was not favorable.—*Wm. G. Burns.*

Indiana.—Corn was practically all safe from frost by the end of the month and promised an exceptionally good yield. Tomatoes ripened rapidly during the last ten days and canneries continued in operation. Tobacco was cut and housed under favorable conditions. Peaches, pears, and grapes yielded fairly well, but apples were a light crop. Clover seed was light and generally of an inferior quality. Seeding of wheat and rye was general after the 20th. Pastures afforded good food.—*A. V. Randall.*

Iowa.—September was frostless, with mean temperature 2° above normal, and with moderate precipitation, except in southwest district. Conditions generally were excellent for normal development of the corn crop, which was practically mature at close of month. From the 18th to 30th clear, bright, and warm days were highly favorable for ripening late planted corn, thrashing, fall plowing, and harvesting second crop of clover, aftermath, and wild hay. Except potatoes and apples, farm crops were above average.—*John R. Sage.*

Kansas.—Wheat sowing began by the 19th and soon became general. Much corn was cut and considerable husking done, disclosing a fine crop. Prairie haying was finished and potato digging and apple picking begun. The hay crop was large and of good quality, but the potato and apple crops proved disappointing. All corn was safe from frost, except a small per cent in the northern parts of Republic and Jewell counties and about five per cent in Decatur County.—*T. B. Jennings.*

Kentucky.—Temperature and precipitation varied only slightly from normal, but precipitation was uneven, the deficiencies occurring in the extreme western and portions of the northern and northeastern sections, while the greatest excess was in the south-central section. Tobacco was all housed and a nice crop of good quality cured. Corn matured and was mostly shocked at end of the month. Extensive plowing and considerable wheat sowing had been done.—*F. J. Walz.*

Louisiana.—Favorable weather for farming operations prevailed until the close of the month, when a Gulf storm moved northward over the State, causing heavy rain and high winds. Cotton picking was retarded and some lint damaged. Caterpillars and boll worms damaged the crop considerably. Some damage was done in western portion by the cotton boll weevil. The crop deteriorated during the month and was considerably below the average. Sugar cane suffered some damage from high winds; otherwise the crop was promising. Rice harvest made good progress. The bulk of the corn crop was housed. Truck gardens were injured by heavy rains.—*I. M. Cline.*

Maryland and Delaware.—Temperature moderate; precipitation light, but well distributed; very favorable weather. Corn ripened slowly, but was safe before the end of the month and an excellent crop was assured. Corn fodder unusually heavy and other silage crops good. A good yield of buckwheat was harvested. Early sown wheat was coming up well, and the preparation of ground was nearing completion. Apples and pears were plentiful. Tobacco was a light crop, but cured satisfactorily. Potatoes averaged a fair yield. Tomatoes were a very short crop. Pastures were good.—*C. F. von Herrmann.*

Michigan.—September weather conditions generally favorable for maturing and harvesting of corn, beans, buckwheat, and sugar beets. Corn generally fully matured without being damaged by frost, and yielded excellently. Beans and buckwheat generally well secured at end of second decade. Plowing and preparation of ground for winter wheat and rye seeding well advanced by middle of month, and seeding nearly completed at close. Germination generally good. Potato blight and rot continued throughout month, and yield of late potatoes was poor. Peaches and plums yielded abundantly, but were poor in quality. Apple yields were very poor.—*C. F. Schneider.*

Minnesota.—The heaviest rains occurred on the 1st, 2d, 3d, 14th, 18th, and 19th. No injury by frost, except possibly in extreme north, and vegetation green at end of month. Some late flax cut during month. Thrashing from stack well advanced. Good corn crop about all gathered in good condition. Potatoes being dug. Second crop clover green and being made into hay. Rye and winter wheat seeding finished in good condition. Plowing was in progress all the month.—*T. S. Outram.*

Mississippi.—Weather conditions were generally favorable for crops, except heavy rains at the close of the month in the extreme southwestern counties, where lowland cotton was overflowed. There was some complaint of shedding and premature opening of cotton, and worms damaged the crop in west. Bolls opened rapidly on uplands, but slowly on lowlands in north. Picking was general, being well advanced south. The yield was considerably below the average. Much hay was saved in excellent condition. Corn gathering progressed fairly well, with poor to fair yields. Sugar cane and potato crops were good. Minor crops and pastures did well.—*W. S. Belden.*

Missouri.—Corn was fully matured at the close of the month and heavy yield assured, although much loss occurred on bottom lands from floods, the result of excessive rains from the 14th to 19th inclusive. Cotton deteriorated and the crop was generally inferior; picking became general about the 20th. Potatoes gave fair returns, although considerable blight was reported. Preparations for wheat sowing made good progress where not hindered by rains; early sown grain was coming up well. Pastures and all forage crops were satisfactory.—*George Reeder.*

Montana.—Favorable temperature prevailed, except during the first week, when potatoes and gardens were injured locally by frost. Moisture was deficient, but enough in most sections to germinate fall wheat, and most of the early sown came up. Stock and ranges were in satisfactory condition as a rule. Apple picking and potato digging were completed. Some late fields of grain were harvested early in the month and a third crop of alfalfa was cut in some southern and eastern counties. Thrashing was in progress throughout the month.—*R. F. Young.*

Nebraska.—The high temperature and ample moisture of the month caused corn to mature rapidly and under most favorable conditions. The crop was heavy and of excellent quality. Rapid progress was made with winter wheat seeding. The early sown came up quickly to an excellent stand. Haying was finished, with an excellent crop secured. Thrashing progressed rather slowly. Pastures and ranges were in excellent condition throughout the month. Late potatoes were a light crop.—*G. A. Loveland.*

Nevada.—Warm days and cool nights. Light to heavy showers fell during the latter part of the month. Thrashing was practically completed. Light third crop of alfalfa was harvested. Warm days benefited late vegetables, which were harvested with fair results. Frost damaged vegetables in the latter part of month. The honey crop was better than previous reports indicated. Water for irrigation and stock was low and range grasses were dry, but cattle were generally in fair condition.—*H. F. Alps.*

New England.—Unusually heavy rains fell during the month, and the average precipitation, 5.41 inches, has been exceeded but once in the section records for September. During the last two decades the rainfall was below normal. Light to killing frosts on the 15th and 27th were not generally injurious to vegetation. Except during the opening days of the month, the weather was favorable to maturing and harvesting crops, and to fall plowing and seeding.—*J. W. Smith.*

New Jersey.—The month, especially the last decade, was very favorable for the late maturing crops and for seeding of wheat and rye. The heavy frosts on the 26th and 27th did no serious injury. The temperature was slightly below the normal. The precipitation was largely in excess, except at stations along the southern sea coast, where it was slightly deficient.—*Edward W. McGann.*

New Mexico.—Temperature and rainfall were slightly in excess of normal. The month was favorable to crops, ranges, and stock. First light

SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS, SEPTEMBER, 1905.

In the following table are given, for the various sections of the Climate and Crop Service of the Weather Bureau, the average temperature and rainfall, the stations reporting the highest and lowest temperatures with dates of occurrence, the stations reporting greatest and least monthly precipitation, and other data, as indicated by the several headings.

The mean temperatures for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperature and precipitation are based only on records from stations that have ten or more years of observation. Of course the number of such records is smaller than the total number of stations.

Section.	Temperature—in degrees Fahrenheit.								Precipitation—in inches and hundredths.					
			Monthly extremes.								Greatest monthly.		Least monthly.	
	Section average.	Departure from the normal.	Station.	Highest.	Date.	Station.	Lowest.	Date.	Section average.	Departure from the normal.	Station.	Amount.	Station.	Amount.
Alabama	76.2	+ 0.4	Tuskegee	102	23	Anniston	46	22	2.51	—0.24	Daphne	12.46	Livingston	0.57
Arizona	75.9	0.0	Aztec	118	11	Flagstaff (a)	26	30	1.97	+0.69	Huachuca Reservoir	5.70	Aztec	0.10
Arkansas	74.2	+ 0.2	Howe	100	1	Oregon	44	4	3.90	+0.42	Fayetteville	8.03	Luxora	0.50
California	68.6	— 0.3	Volcano Springs	118	2	Bodie	— 1	30	0.16	—0.28	Monumental	2.90	50 stations	0.00
Colorado	59.2	+ 1.7	Holly	99	1	Wagon Wheel Gap	13	19	1.32	+0.17	Antelope Springs	3.70	Canyon City	0.02
			Lamar	99	15, 16									
Florida	80.6	+ 1.5	Molino	103	20	Molino	58	3 dates	7.62	+0.45	Malabar	17.73	St. Andrew	2.58
Georgia	†74.8	+ 2.4	Hawkinsville	102	1, 20	Dahlonega	51	6	2.82	—2.52	St. Marys	15.35	Waynesboro	0.08
						Ramsey								
Hawaii	74.8	.....	Kihei, Maui	94	16	Humuula, Hawaii	37	22	‡8.31	.....	Honomanu Valley, Maui.	33.94	Kekaha, Kauai	0.18
						Chesterfield	16	19						
Idaho	59.0	.....	Glenns Ferry	107	2	Forney	16	29	1.14	.....	Collins	4.38	Glenns Ferry	0.00
						Vernon	16	18						
Illinois	68.4	+ 1.6	Bloomington, Cisne	97	1	Rushville	39	7	2.92	—0.37	Chester	9.20	Cairo	0.69
			Raum	97	27									
Indiana	67.8	+ 0.8	Rome	98	1	Bluffton	35	24	3.49	+0.57	Northfield	8.16	Columbus	0.87
Iowa	65.8	+ 2.0	Mt. Ayr, Ottumwa	96	1	Washta	36	4	3.81	+0.50	Thurman	13.18	Clear Lake	0.50
Kansas	71.4	+ 2.2	Independence	107	1	Colby	35	19	5.06	+2.77	Madison	11.76	Farnsworth	0.46
Kentucky	70.2	+ 0.2	Loretto	95	18	Farmers	36	27	2.61	—0.02	Greensburg	6.13	Cattlettsburg	0.52
Louisiana	79.1	+ 2.0	Alexandria	102	9	Minden	50	5	5.50	+2.15	Venice	12.74	Mansfield	0.30
Maryland and Delaware	67.1	— 0.3	Boettcherville, Md	94	18	Deer Park, Md	24	26	2.91	—0.56	Seaford, Del	6.19	Chewsville, Md	1.37
Michigan	62.0	+ 2.2	Allegan	96	28	Thomaston	20	13, 14	3.15	—0.02	Mackinac Island	8.20	Grand Marais	0.76
Minnesota	61.9	+ 3.2	Long Prairie	92	11	Hallock	28	12	3.45	+0.57	Hovland	8.19	Ashby	1.25
Mississippi	76.8	+ 1.8	Magnolia	101	7, 8	Ripley	46	21	3.39	+0.51	Suffolk	9.77	Quitman	0.50
Missouri	69.6	+ 1.1	Versailles	98	1	Willowspring	41	5	7.67	+3.97	Marshall	16.34	Sikeston	0.55
Montana	58.8	+ 3.7	7 stations	95	10, 22	Grayling	10	18	0.90	—0.30	Saltese	2.84	3 stations	T.
Nebraska	65.9	+ 1.9	Kirkwood	99	11	Agate	27	19	3.79	+1.68	Nebraska City	11.34	Fort Robinson	0.39
Nevada	61.1	+ 0.4	Battle Mountain	103	1	Potts	19	30	0.51	+0.14	Pioche	3.28	2 stations	0.00
New England*	59.8	— 1.8	Waterbury, Conn	89	30	Houlton, Me	22	15	5.41	+2.03	Durham, N. H	10.68	Chesuncook, Me	1.18
						Van Buren, Me								
New Jersey	65.4	— 0.6	Flemington	90	30	Charlotteburg	28	27	5.23	+1.33	Chester	9.18	Atlantic City	2.87
						Layton								
New Mexico	67.4	+ 0.6	San Marcial	106	2	Elizabethtown	22	19	2.08	+0.87	Socorro	7.96	Fort Stanton	T.
New York	61.1	+ 0.5	Elmira	98	18, 19	North Lake	18	14	3.90	+0.15	Blue Mountain Lake	8.50	Shortsville	0.77
North Carolina	71.8	+ 1.4	Lumberton	97	20	Linnville	37	25	2.51	—1.78	Currituck Inlet	9.60	Linville	0.00
						Pink Beds	37	23						
North Dakota	59.8	+ 2.6	Berthold Agency	99	28	Hannah	23	12	1.63	+0.63	Rolla	7.17	Lamoure	0.22
Ohio	65.3	— 0.1	Thurman	95	19	Orangeville	30	27	2.86	+0.49	Urbana	7.59	Ironton	0.63
Oklahoma and Indian Territories.	75.3	+ 1.9	3 stations	105	1	Kenton, Okla	41	19	3.12	—0.23	Webbers Falls, Ind. T	6.07	Durant, Ind. T	0.23
Oregon	60.0	+ 1.7	3 stations	98	1, 23	Silver Lake	20	3 dates	2.12	+0.59	Glenora	9.79	Van	0.04
Pennsylvania	64.0	+ 0.4	Lycippus	95	29	Coudersport	27	26	3.41	+0.03	Manchchunk	7.76	Greensboro	1.70
						Pocono Lake	27	27						
Porto Rico	79.8	.....	San Lorenzo	101	14	Adjuntas	55	29	8.48	.....	Humacao	16.34	Cidra	4.21
South Carolina	76.2	+ 2.0	8 stations	98	4 dates	Seivern	49	29	1.91	—1.91	Darlington	8.60	Due West	T.
South Dakota	64.3	+ 3.3	Chamberlain	103	23	Pine Ridge	30	3	1.57	—0.10	Vermillion	4.80	Ipswich	0.10
			Stephan											
Tennessee	72.0	+ 2.1	6 stations	93	6 dates	Erasmus	36	25	2.25	—0.73	Nashville	6.12	Leadvale	0.02
Texas	78.9	+ 2.0	Albany	104	1	Channing	42	19	2.31	—0.64	Temple	7.85	Hearne	0.00
Utah	60.7	— 0.4	Hite	104	1, 2	Woodruff	12	13	2.10	+1.45	Fort Duchesne	5.92	Ibapah	0.40
Virginia	68.5	0.0	Cape Henry	93	20	Lincoln	33	26	2.69	—0.69	Arvonia	4.80	Bristol	0.60
			Woodstock	93	19									
Washington	59.6	+ 1.4	Zindel	97	1, 22	Lind	23	29	2.51	+0.93	Tatoosh Island	10.21	Wahluke	0.02
West Virginia	65.6	— 0.6	Moorefield	97	1	Bayard	29	26	2.21	—0.25	Elkhorn	4.21	Point Pleasant	0.54
Wisconsin	62.0	+ 2.8	Darlington	91	26	Butternut	27	13	3.19	—0.10	Grantsburg	7.73	Madison	0.58
Wyoming	55.7	+ 1.5	Fort Laramie	97	23	Riverside, Y. N. P.	12	18	1.20	+0.38	Bedford	2.64	Lusk	0.00

* Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. † 48 stations, with an average elevation of 639 feet. ‡ 133 stations.

to killing frosts occurred about the middle and toward the close of the month, but damage was slight, owing to mature condition of crops. Good yields of corn, cane, beans, kafir corn, and milo maize were secured. Harvest of hay was completed and much native or gramma hay stacked. Stock in excellent condition. Range prime and promising abundant winter feed.—*J. B. Sloan.*

New York.—The weather during the month was generally favorable for maturing and gathering fall crops. Killing frosts occurred in some localities, but did little damage, as crops likely to be affected had been secured. Corn and buckwheat were mostly secured in good condition. Potatoes continued to rot and were being dug. Hops were picked during the first half of the month, and the bean harvest was completed late in the month. All the early fruits were picked and the late varieties were being gathered.—*H. B. Hersey.*

North Carolina.—Temperature 1.4° above normal and precipitation 1.78 inches below normal; weather too dry for crop growth and fall plowing. Dry weather caused cotton to open rapidly; bulk of crop open and three-fifths of crop picked at end of month. Early corn had matured and was being gathered. Good crops of hay, fodder, and pea vine hay secured. Peanuts and potatoes were being dug; cabbages a failure; turnips fair. A fair crop of tobacco had been practically all cut and cured at the end of the first decade.—*A. H. Thiessen.*

North Dakota.—The weather during the month was generally favorable for maturing late grain, as well as flax and corn, but was not entirely favorable for thrashing, which was frequently interrupted by rains and high winds. Work in the fields in some parts of the Red River Valley had to be stopped, as the ground was too wet to get on with harvesting machines. Light frosts occurred in the central and killing frosts in the northern sections about the middle of the month, doing but little damage.—*B. H. Bronson.*

Ohio.—The temperature averaged close to normal. Precipitation was in excess, except in the southern section, where a slight deficiency occurred. The maximum temperature occurred generally on the 28th and 29th and minimum on the 26th. Rain periods were the 1st and 2d, 10th and 11th, and 15th to 19th. Corn improved during first half of month, and at close was practically all out of danger from frost. Apples poor. Peaches fair. Grapes and tobacco good. Garden crops mostly good. Wheat seeding progressed rapidly. Pastures were generally in good condition at close of month.—*J. Warren Smith.*

Oklahoma and Indian Territories.—Temperature average; precipitation slightly above the average, but unevenly distributed; conditions droughty over the southeastern portion and late crops somewhat damaged. Cotton was late and yields ranged from poor to fair, but of a good quality; continued damage by boll worms and shedding reported.

Early corn secured and being husked, with poor to good yields; late maturing, with poor to fair prospects. Broom corn and forage crops being secured, with good yields.—*C. M. Strong.*

Oregon.—Showers were general during the latter half of the month. Thrashing was practically completed by the 12th; the grain crop was a very good one. Hops were nearly all harvested by the 24th; the yield was better than expected. The potato crop was below average both in quantity and quality. Corn matured nicely; the crop was above average. Prunes yielded about one-half of a full crop, though they were excellent in quality.—*Edward A. Beals.*

Pennsylvania.—Temperature and precipitation nearly normal. Buckwheat harvesting nearly completed and a full average yield in prospect. Corn cutting well advanced, and late crop nearly safe. Soil in excellent condition; seeding well advanced, and early sown grain up and stand good. Tobacco curing nicely, and crop best in years. Most pastures furnishing ample feed. Garden truck abundant and of good quality. Apple crop light and inferior; peaches and pears fair. No general killing frosts.—*T. F. Townsend.*

Porto Rico.—The weather of the month was generally favorable for farm operations and for all growing crops. The drought in the southern and in the northwestern sections was broken during the latter portion of the month. Tobacco seed beds were in excellent condition, and an unusually large acreage was prepared for tobacco planting. Coffee picking begun, with a prospect of a very large crop. Cotton reports were generally unfavorable, and a decreased acreage was indicated. The sugar cane outlook was excellent. Minor crops were generally abundant.—*A. L. Brockway.*

South Carolina.—Month unusually dry, with temperature above normal, conditions conducive to rapid ripening of fall crops. Cotton opened freely and over two-thirds of the crop was picked. Except a slight deterioration due mostly to drought, cotton suffered no material change in condition. Some corn was housed, rice thrashed, and a large quantity of prime hay made. The ground was too dry to plow, delaying oat seeding. Truck seed germinated poorly in some districts and all truck suffered from want of rain.—*J. W. Bauer.*

South Dakota.—Month warmer than usual, very favorable for ripening an unusually good crop of corn and for curing range grass. Stacking was completed. Thrashing advanced well, though slightly retarded by rains. Very satisfactory yields of oats, barley, spelt, flax, and millet were indicated, but yield and quality of wheat were variable, and considerable barley was discolored. Flax harvest was practically finished. A fine crop of hay was nearly all secured. Potatoes were rather disappointing. Pasturage was good. Fall seeding was in progress. Insufficient moisture retarded plowing.—*S. W. Glenn.*

Tennessee.—Conditions were generally favorable for the maturing of crops. Cotton opened rapidly on uplands, but slowly on lowlands, where the plant was still growing; excess of stalk and light fruitage were generally reported. Early corn was a good crop; late corn fairly good. The tobacco crop was fine and was curing well. A short peanut crop was indicated. Late Irish potatoes were fine; sweet potatoes fairly good. Yields of sorghum were generally excellent. The rainfall was generally deficient and plowing and seeding were much hindered. Some early sown grains were coming up.—*H. C. Bate.*

Texas.—Generally warm during September, with changes to colder about the end of second and third decades. Rainfall was generally deficient, though good rains fell in localities. Vegetation deteriorated, except in localities where good rains fell. Wheat seeding was delayed and some that was seeded failed to germinate properly. Average condition of cotton did not change greatly. There was some improvement north, but deterioration elsewhere. Boll weevils increased during the month. Weather favorable for picking, which was pushed rapidly. Rice and sugar cane generally did well. Other crops suffered from drought.—*M. E. Blystone.*

Utah.—Temperatures were about normal, but the average precipitation was considerably above the highest ever recorded previously. Farm work was pushed vigorously, fall crops were mostly gathered, and a great deal of fall seeding was done. Scattering jobs of thrashing were being cleaned up, and the last alfalfa crop and late apples and peaches were being gathered. Beet digging was becoming general. The range was splendid, promising abundant winter feed, and stock was fine.—*R. J. Hyatt.*

Virginia.—The weather was more than ordinarily favorable for the securing of crops and for general fall work. Fall seeding was well advanced at the close of the month. While the rainfall was below the average, the pastures and tilled ground remained in good condition. No generally destructive frosts occurred. Corn and tobacco proved good crops. The quality of tobacco was excellent. Apples were generally a poor crop. Potatoes and all truck products were fair.—*R. R. Briggs.*

Washington.—The month was warm and the latter part unusually rainy; in the northwest counties it was the wettest September on record. Hop picking and thrashing of wheat and oats were interrupted by wet weather. Hop crop was below average. Wheat crop was very good, although some was injured by drought and hot winds; some was wet in shock. Oats were wet in shock, and somewhat discolored in northwest counties; yield good, but a trifle below average. Potato digging in progress; good yield. Pastures improved. Fall plowing and seeding in progress.—*G. N. Salisbury.*

West Virginia.—The weather was very favorable for farm work and occasional showers during the first half were beneficial for crop growth. Plowing progressed rapidly and some seeding was done. At the close of the month corn cutting was nearing completion, with a good yield, pastures were drying up, but stock was in good condition, and millet, buckwheat, and cowpeas were mostly cut, with fairly good yields. The prospects for apples were for less than half a crop.—*E. C. Vose.*

Wisconsin.—Killing frosts occurred over the northern and central counties on the 12th and 13th, resulting in considerable damage to corn, potatoes, and gardens. No frost of consequence occurred in the southern section during the month. Corn was generally a very satisfactory crop, but potatoes were poor both in quality and yield. Apples were generally light. The cranberry crop was damaged by high water and insects and the yield was quite unsatisfactory.—*W. M. Wilson.*

Wyoming.—The first half of the month was favorable for the maturing and harvesting of grain, and a good to excellent crop was secured in all sections of the State. Late haying was completed under favorable conditions. Over much of the lower portions of the State no severe frosts occurred during the entire month, and all grain crops and vegetables matured without being injured by freezing.—*W. S. Palmer.*

SPECIAL ARTICLES.

THE LIFTING POWER OF ASCENDING CURRENTS OF AIR.

By HENRY HELM CLAYTON. Dated Blue Hill Observatory, October 17, 1905.

Several instances of the lifting power of the ascending currents of air in ordinary quiet summer weather have come to my attention, and may be of interest to students of the atmosphere and aeronautics.

The first was on August 6, 1894, soon after beginning work with kites at Blue Hill, when a small kite belonging to Mr. Eddy was caught in an ascending current about 50 feet above Blue Hill and lifted rapidly toward the zenith, circling above the heads of the observers as it rose. The string hung loosely beneath the kite, which continued to draw up fresh string from the ground as it ascended. A large cumulus cloud was passing the zenith at the time, and after the kite had risen some 500 feet it slowly followed the cloud off toward the east, but continued to ascend until 1172 feet of cord had been carried up and the kite was estimated to be about 1000 feet above the hill. At this point the kite was drawn out of the ascending current, and being unable to support its own weight and that of the string fell rapidly to the ground. This description is condensed from notes made by me at the time. The occurrence was witnessed by some half dozen persons, among them being Mr. John Ritchie, jr., of Boston, Mass., who sends the following account of a similar occurrence:

On Friday, September 8, 1905, the walking party of the Appalachian Mountain Club observed a curious atmospheric phenomenon, the action apparently of a vortex. The party had reached the northern summit of Chocorua, in the Sandwich Range, N. H., a subordinate peak, which itself rises sharply from its valleys; its height above the sea is about 3000 feet. The party was seated on the summit engaged in consuming the luncheon, when Mr. J. A. Alden called attention to the movement of a bit of a paper from his box. It was a piece of common paraffine paper, perhaps six by four inches, and had been folded. It was blown out of the box by the wind and, instead of drifting horizontally or settling, it began at once to rise in the air. It retained its folded form, making three sides of a parallelopipedon, there being no ends. The day was perfectly clear and there was very little wind stirring. The sky was bright, blue, and a few small cumulus clouds hung about, not more than half a dozen and all of them small. One of the clouds was to the north of the peak and the others to the south. The attention of the party was directed to the paper which floated steadily upward with moderate velocity. It was not as if blown by a gust of wind, but rose quietly and steadily. We watched it until it became difficult to see, even with the sun shining on it, and finally lost it. We estimated that it had risen at least a thousand feet before it became invisible. It rose at a small angle to the vertical and disappeared at an apparent elevation of about 70° above the horizon. It did not drift in the direction of any clouds, but midway between the two groups. Its general drift was to the west.

In my opinion both the kite and the paper were lifted by

ordinary ascending currents of air such as commonly exist on summer days. It will be noticed that in both cases the objects started from a considerable elevation above sea level, where the currents had decided vertical velocity. It is probable that near the ground over a level country the air can have no great vertical motion, except in whirlwinds, so that phenomena of this kind are not observed. The kites flown at Blue Hill frequently give evidence of strong vertical uplift when they are at a considerable distance above the ground. On May 1, 1900, a kite weighing eleven pounds, carrying a meteorograph weighing three pounds, and 1000 feet of wire weighing about five pounds, was lifted to an angle of 90° above the horizon as measured by a theodolite, and remained in the vicinity of the zenith for nearly two minutes.

RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

C. FITZHUGH TALMAN, Acting Librarian.

The following titles have been selected from among the books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Most of them can be loaned for a limited time to officials and employees who make application for them.

Bremen.
Deutsches meteorologisches Jahrbuch für 1904. Jahrg. XV. xii, 76 pp. f°. Bremen. 1905.

Comité international des poids et mesures.
Procès-verbaux des séances. Session de 1905. vi, 243 pp. 8°. Paris. 1905.

Hamburg. Deutsche Seewarte.
Wind, Strom, Luft- und Wassertemperatur des Mittelmeeres. (Beilage zu den "Annalen der Hydrographie." 1905.) 60 pp. 4°. Berlin. [1905.]

Holland. Koninklijk Nederlandsch Meteorologisch Instituut.
Onweders, optische verschijnselen, enz., in Nederland, 1903. 101 pp. 8°. Amsterdam. 19 5.

Natal. Government Astronomer.
Report of the Government Astronomer, 1904. 55 pp. f°. Pietermaritzburg. 1905.

Observatoire magnétique et météorologique de Zi-Ka-Wei.
Bulletin des observations. Année 1902. xii, 221 pp. f°. Chang-Hai. 1905.

Riabouchinsky, D.
Institut aerodynamique de Koutchino [Description of]. 8 pp. 8°. St. Petersburg. 1905.

Schubert, Johannes.
Der Wärmeaustausch im festen Erdboden, in Gewässern und in der Atmosphäre. 30 pp. 8°. Berlin. 1904.
Wald und Niederschlag in Westpreussen und Posen. 15 pp. 8°. Eberswalde. 1905.

South Australia. Government Astronomer, etc.
Meteorological observations made at the Adelaide Observatory and other places in South Australia and the Northern Territory during the year 189 . xvi, 91 pp. f°. Adelaide. 1902.
[Same for] 1900–1901. xx, 167 pp. f°. Adelaide. 1904.

Udden, Johan August.
On the cyclonic distribution of rainfall. 21 pp. 4°. Rock Island. 1905.

Walz, F. J.
Fake weather forecasts. (Reprinted from Popular Science Monthly, October, 1905.) Pp. 503–513.

Western Australia. Government Astronomer.
Meteorological observations made at the Perth Observatory and other places in Western Australia during the year 1902. 143 pp. f°. Perth. 1903.

Yearbook of scientific and learned societies of Great Britain and Ireland, 1904. vi, 300 pp. 8°. London. 1905.

RECENT PAPERS BEARING ON METEOROLOGY.

C. FITZHUGH TALMAN, Acting Librarian.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——

American Journal of Science. New Haven. 4th Series. Vol. 20.
Barus, Carl. On groups of efficient nuclei in dust-free air. Pp. 297–300.

Bulletin of the American Geographical Society. New York. Vol. 37.
Peary, R[obert] E[dwin]. Peary Arctic Club expedition, summer of 1905. Pp. 594–600.
W[ard], R[obert] DeC[ourcy]. Antarctic meteorology. [Note on paper by R. C. Mossman in Symons met. mag., June, 1905.] Pp. 613–614.
W[ard], R[obert] DeC[ourcy]. Chilean meteorology. Pp. 606–607.
W[ard], R[obert] DeC[ourcy]. Climate and weather of Turkestan. [*Review of* Explorations in Turkestan. By Pumpelly, W. M. Davis, and E. Huntington.] Pp. 608–609.
W[ard], R[obert] DeC[ourcy]. Flow of the Thames in relation to pressure and rainfall changes. [Note on paper by W. J. S. Lockyer in Nature, June 22, 1905.] P. 611.
W[ard], R[obert] DeC[ourcy]. Inversions of temperature on Ben Nevis. [Note on paper by A. Watt in Nature, v. 71, p. 583.] Pp. 611–612.
W[ard], R[obert] DeC[ourcy]. Meteorological results of the Nansen expedition. [*Review of* the Norwegian North Polar expedition, 1893–1896. Scientific results; vol. 6, Meteorology. By H. Mohn.] Pp. 629–632.
W[ard], R[obert] DeC[ourcy]. Meteorology of India, 1892–1902. P. 609.
W[ard], R[obert] DeC[ourcy]. Nile basin rains. [*Review of* Rains of the Nile basin in 1904. By H. G. Lyons.] Pp. 600–601.

Physical Review. Lancaster. Vol. 21.
Holborn, L., and Austin L. W. On the specific heat of gases at high temperatures. Pp. 209–228.

Scientific American. New York. Vol. 93.
—— Apparatus for observing and automatically registering thunderstorms. P. 278.
—— Dufaux flying machine. P. 316.
—— Long-distance balloon race from Liege. P. 278.
—— Prevention of hailstorms. A review of recent experiments. P. 322.

Terrestrial Magnetism and Atmospheric Electricity. Baltimore. Vol. 10.
Burbank, J. E. Specific electrical conductivity of the air at sea. P. 126–129.

Western Electrician. Chicago. Vol. 37.
—— Effect on atmospheric electricity of the eruption of Mount Pelée. P. 274.

Geographical Journal. London. Vol. 26.
Lyons, H. G. On the Nile flood and its variation. Pp. 395–421. Continued from P 272.

Science Abstracts. London. Vol. 8.
Ros[enhain], W. Direct-reading resistance thermometers. Composite thermo-couples. [Abstract from A. Campbell, Phys. soc. proc., v. 19, p. 555–565.] P. 571.

Archives des Sciences Physiques et Naturelles. Genève. 4 Période. Tome 20.
Bjerknes, V. Sur la formation des tourbillons dans un fluide sans frottement avec une application à l'analogie des phénomènes hydrodynamiques et électrostatiques. Pp. 268–284.
—— Observations météorologiques faites aux fortifications de Saint Maurice pendant les mois de mars, avril, et mai, 1905. Pp. 285–292.

Comptes Rendus de l'Académie des Sciences. Paris. Tome 141.
De la Vaulx, Henry and Jaubert, Joseph. Sur les observations météorologiques faites à Constantine pendant l'éclipse du 30 août, 1905. Pp. 512–513.
Deslandres, H. Note préliminaire sur l'observation de l'éclipse totale du soleil du 30 août 1905, à Burgos. Pp. 517–518.
Eginitis, D. Observation de l'éclipse solaire du 30 août à Athénes. Pp. 520–521.
Libert, Lucien. Sur le phénomène des ombres volantes. P. 513–514.
Meslin, Georges. Sur l'éclipse du 30 août 1905 et sur la polarisation de la couronne solaire. P. 493–496.
Moureau, Th. Trombe du 28 août 1905 à Saint-Maur et à Champigny (Seine). Pp 510–511.
Monaco, Albert, Prince de. Sur les lancements de ballons sondes et de ballons pilotes au-dessus des océans. Pp. 492–493.
Rayet, C. Éclipse totale du soleil du 30 août 1905. Pp. 490–491.
Salet. Observation de l'éclipse totale du 30 août 1905 faite à Robertville (Algérie). Pp. 528.

L'Aérophile. Paris. 13 année.
Nicolleau, A. Le Santos-Dumont XIV à Trouville. Pp. 200–201.
Goupil, A. Calculs sur l' aéroplane de M. Archdeacon. Pp. 207–209.
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THE WEST INDIAN HURRICANE OF AUGUST 11, 1903.

By MAXWELL HALL, Esq. Dated Montego Bay, Jamaica, August 14, 1905.[1]

I. THE HISTORY OF THE HURRICANE BEFORE AUGUST 11.

The first intimations we had in Jamaica of this great storm came from the Weather Bureau at Washington, and the following notices were posted in Kingston by the local branch of that Bureau:

August 8, 11:30 a. m.—Washington Weather Bureau notifies evidence of a disturbance ESE. of Barbados, moving N. of W.

August 8, 4 p. m.—Central Bureau, Washington, notifies that the disturbance E. of Barbados will move NW. over the Windward Islands. It is probably of dangerous strength.

August 10, 4:15 p. m.—The following has been received from the Central Bureau in Washington: Disturbance apparent; marked strength; moving N. of W. over or near Santo Domingo. Reports from Santo Domingo missing.

But as a matter of fact the hurricane moved in a straight line from Martinique to Jamaica, and then over Cayman Islands and Yucatan to the coast of Mexico where it disappeared. The following extracts are taken from the account given by Professor Garriott in the United States MONTHLY WEATHER REVIEW for August, 1903:

[1] In editing this article the Editor has, with the author's permission, substituted "hurricane" for "cyclone" as the text applies specifically to the former.

Martinique appears to be the only island of the Windward group that suffered serious damage. The vortex of the storm passed over or near that island moving in a northwesterly direction during the night of the 8–9th, unroofing several hundred houses, destroying crops, and damaging a number of sailing vessels.

Reports from Kingston, Jamaica, show that the first effects of the storm were felt on that island on the 10th, and that the main hurricane center reached the island on the morning of the 11th, causing a heavy loss of life and property. At Kingston the minimum barometer, 28.80 inches, as indicated by the barograph, occurred at 5:30 a. m. of the 11th, and at 6:15 a. m. the barometer had risen to 29.36. The anemometer cups were disabled, but the maximum wind velocity at Kingston was estimated at 65 miles an hour. The principal sufferers were the owners of banana plantations whose losses were estimated at more than £500,000. The orange, pimento, and coffee crops suffered severely; the towns of Port Antonio and Port Maria were almost destroyed, and throughout the parishes of St. Mary, Portland, St. Andrew, St. Catherine, and St. Thomas the destruction of houses, property, and plantations was appalling. Kingston, with the exception of damage to houses and warehouses on the sea front, suffered less than any other place on the island.

Later advices show that the Cayman Islands were devastated on the evening of the 11th. Captain Hunter, of the schooner *Governor Blake*, has furnished notes regarding the storm at Georgetown, Grand Cayman Island. According to his observations the 8th and 9th were clear and bright at Grand Cayman Island. The 10th was unusually warm with a NNE. wind that freshened steadily. In the afternoon the weather became cloudy and a little rain fell in the evening. From 8 a. m. to 8 p. m., local time, the barometer fell from 29.80 to 29.70 inches. At 1 p. m. of the 11th the barometer read 29.50 inches, the wind was blowing about 30 miles an hour from the NNE. and the sky was covered with thick, black clouds from the same quarter. At 4 p. m. the wind was blowing about 45 miles an hour, and at 5 p. m., with the barometer at 29.30 inches, the wind was blowing in heavy gusts at 65 miles, and the clouds hung so low that they seemed to almost touch the tree tops. At 7 p. m. the roaring of the wind began, and at 8 p. m., with the barometer reading 29.00, the wind blew at 90 miles an hour in terrific gusts that churned up the water in the harbor of Georgetown and blew out to sea or capsized several vessels. At this time, 8 p. m., it was supposed that the worst of the storm had passed, but soon the barometer began to fall so rapidly that the needle of the aneroid could be seen to move. The barometer fell until 10 p. m., when it stood at 28.30 inches with the wind blowing 110 to 120 miles an hour from ENE. to ESE. in gusts. About midnight it became almost calm for about 30 minutes, after which the wind came on fiercely from the SE. At 1 a. m. of the 12th the barometer began to rise, and at 6 a. m. it read 29.30, and at noon 29.70.

About 200 houses were blown down or unroofed, seven out of eight churches on the island were destroyed, vessels on the stocks were picked up and dashed to pieces, and of the 23 vessels in the harbor of Georgetown but one, the *Governor Blake*, was saved. Most of the crews on board perished, but no one on shore was killed.

From the cyclonic point of view this story requires the following explanatory note.

On the 11th at 5 p. m. the schooner *Governor Blake*, with Captain Hunter on board, parted her cable in Georgetown Harbor, and scudded to the south before the hurricane; and from the above account it will be seen that the *Governor Blake* got involved in the worst part of the storm, and was not thrown out, or left behind, until 1 a. m. on the 12th. She returned to Georgetown after a few days, having made several gallant rescues.

From other sources we learn that at Georgetown the hurricane raged with appalling violence from 9 to 11 o'clock, the wind veering from NE. to SE., so that the center must have passed a few miles to the south of the town at about 10 p. m.

Now the distance from Martinique to Kingston, Jamaica, is about 1095 miles; the distance from Kingston to Montego Bay is 83 miles; the distance from Montego Bay to Grand Cayman Island is 238 miles. As the center passed over Montego Bay at 9:30 a. m., we have the following velocities of the center along its course: from Martinique to Kingston, twenty miles an hour; from Kingston to Montego Bay, twenty-one miles an hour; and from Montego Bay to Grand Cayman Island, nineteen miles an hour. Hence, we shall assume that the center proceeded from Martinique to Grand Cayman Island at a uniform velocity of twenty miles an hour.

The accompaning chart, fig. 1, shows the position of the center of the hurricane at Greenwich, mean noon daily, from the 9th to the 12th, and the corresponding approximate local times.

II. THE PASSAGE OF THE HURRICANE OVER JAMAICA AUGUST 11.

We have now to consider the passage of the hurricane along almost the whole length of Jamaica, according to the following observations and notes arranged in order of time with respect to the passage of the center.

It may be here stated that the mean barometric pressure for August 11, is 29.928 inches; that all barometric pressures here given have been corrected for diurnal variation; that the readings of mercurial barometers have all been reduced to the Kew standards and to 32° F., sea level, and gravity at 45°, and that the readings of aneroid barometers have been corrected so as to make them agree with the mercurial barometers as nearly as possible.

The local reports are as follows:

(1) MORANT POINT LIGHT-HOUSE.

By Mr. W. H. BOORMAN.

At midnight the wind attained unusual force, which gradually increased until 4.30 a. m., August 11, when it became calm for about fifteen minutes, and then the wind changed to the SE.

From this we gather that the center passed a few miles south of the light-house, and that part of the calm area went over the place, so that the change of wind would have been from NNE. to SE. But there is something wrong about the time; it should have been 3:30 instead of 4:30. Indeed the nearest approach of the center to Port Antonio occurred at 4:30 a. m. and the point of nearest approach to Port Antonio was twenty miles WNW. of Morant Point. Mr. Boorman further wrote saying that he was entirely occupied in looking after the light, and this probably explains how the discrepancy occurs.

(2) HOPE GARDENS.

By Hon. WILLIAM FAWCETT.

1903.	Barometric pressure.
August 10, 5:30 p. m	29.77 inches.
10, 9:15 p. m	29.72
11, 3:15 a. m	29.51
11, 4:40 a. m	29.23
11, 4:55 a. m	29.15
11, 5:08 a. m	29.03
11, 5:20 a. m	28.93
11, 5:23 a. m	28.89
11, 5:35 a. m	28.81
11, 5:48 a. m	28.88

After this last observation the pressure continued to increase.

The above pressures were deduced from the aneroid readings sent me by Mr. Fawcett by adding 0.22 inch for reduction to sea level and instrumental error combined.

The Hope Gardens were very near the northern edge of the central calm; the nearest approach occurred at 5:35 a. m., or thereabouts, and the lowest pressure was 28.81 inches.

(3) RICHINGS, NEAR KINGSTON.

By Mr. CHARLTON THOMPSON.

August, 1903.	Barometric pressure.	Wind.		Notes.
		From.	Force.	
	Inches.			
10, 6:15 p.m.	29.77	.....	.....	
10, 7:50 p.m.	29.77	.....	.....	
10, 9 p.m	29.74	.....	.....	
11, 4:30 a.m.	29.22	n.	Heavy squalls	
11, 4:50 a.m.	29.15	n.	Heavy squalls	
11, 5:10 a.m.	29.10	n.	Hurricane	
11, 5:20 a.m.	29.01	nw.	Hurricane	The squalls were terrific.
11, 5:30 a.m.	28.92	nw.	Hurricane	
11, 5:55 a.m.	28.97	sw.	Hurricane	A lull of ten minutes.
11, 6:10 a.m.	29.17	s.	Hurricane	
11, 6:30 a.m.	29.34	s.	Heavy squalls	The heaviest rain was from sw. and s.
11, 6:40 a.m.	29.39	s.	Moderating	
11, 7 a.m	29.45	se.	Moderating	
11, 7:15 a.m.	29.50	se.	Moderating	
11, 7:45 a.m.	29.57	se.	.....	
11, 8:20 a.m.	29.62	se.	.....	

The barometric pressures were deduced from aneroid readings by subtracting 0.11 inch for instrumental error. Part of the calm area passed over Richings, and its nearest approach occurred at 5:35 a. m., which agrees with the time given by Mr. Fawcett. The lowest pressure was 28.92.

(4) KINGSTON.

By Mr. J. H. MILKE.

Date.	Time.	Barometric pressure.	Date.	Time.	Barometric pressure.
		Inches.			*Inches.*
August 10, 1903	Noon	29.80	August 11, 1903	5 a. m.	29.53
Do	1 p. m.	29.80	Do	5:15 a. m.	29.26
Do	2 p. m	29.81	Do	5:30 a. m.	29.21
Do	3 p. m.	29.80	Do	5:45 a. m.	29.11
Do	4 p. m.	20.79	Do	6 a. m	29.01
Do	5 p. m.	29.77	Do	6:15 a. m.	28.95
Do	6 p. m.	29.76	Do	6:30 a. m.	28.93
Do	7 p. m.	29.76	Do	6:45 a. m.	28.93
Do	8 p. m.	29.75	Do	7 a. m.	28.93
Do	9 p. m.	29.74	Do	7:15 a. m.	29.04
Do	10 p. m.	29.73	Do	7:30 a. m.	29.14
Do	11 p. m.	29.73	Do	7:45 a. m.	29.23
Do	Midnight	29.73	Do	8 a. m.	29.33
August 11, 1903	1 a. m.	29.72	Do	9 a. m.	29.47
Do	2 a. m.	29.70	Do	10 a. m	29.54
Do	3 a. m.	29.66	Do	11 a. m	29.66
Do	4 a. m.	29.63	Do	Noon	29.69

The above pressures were deduced from the tracings of the barograph report at Mr. Milke's store in Kings street, by adding 0.05 inch to the readings. It is an ink tracing; the line is rather thick, but the figures above can be relied on to 0.01 or so. The pen remained at the lowest reading, 28.93, longer than would seem proper considering that the place must have been near the southern edge of the calm; the tracing paper had not been carefully adjusted as to time.

(5) VALE ROYAL, NEAR KINGSTON.

By Mr. J. R. SCOTLAND.

August, 1903.	Barometric pressure.	Wind.		Notes.
		From.	Force.	
	Inches.			
10, 5 p. m.	29.77	.....	.....	Barometer steady.
11, 3 a. m	29.60	nw.	In gusts	
11, 3:30 a. m.	29.54	nw.	Strong	
11, 4 a. m.	29.51	nw.	Very strong	At 4 a. m. the cloud drift was: s.-cu. ne.; c.-s. e.; c. ese.
11, 4:30 a. m.	29.40	nw.	Heavy gusts	
11, 4:45 a. m.	29.35	nw.	Hurricane	
11, 5 a. m.	29.30	nw.	Hurricane	
11, 5:10 a. m.	29.24	nw.	70 miles per hour.	
11, 5:20 a. m.	29.21	nw.	70 miles per hour.	
11, 5:40 a. m.	28.97	nw.	70 miles per hour.	
11, 6 a. m.	28.97	nnw.	Light	Lowest barometer. The lull was from 6^h to 6^h 15^m.
11, 6:05 a. m.	28.93	nnw.	Calm	
11, 6:10 a. m.	29.04	wsw.	Strong gusts	
11, 6:20 a. m.	29.17	sw.	Hurricane	
11, 6:30 a. m.	29.41	s.	Very strong	
11, 6:45 a. m.	29.43	se.	Strong	
11, 7:10 a. m.	29.50	se.	Strong	
11, 7:30 a. m.	29.55	se.	Strong	
11, 8 a. m.	29.59	se.	Strong	
11, 9 a. m.	29.66	se.	Brisk	
11, 10 a. m.	29.68	se.	Fresh	
11, 11 a. m	29.70	se.	Fresh	

A mercurial barometer was used and the reading at 5 p. m. on August 10 was used to indicate the errors of the aneroids read near Kingston. The temperature that afternoon was as high as 95.5°. At 3 p. m. on the 10th the cloud drift was as follows: cirrus SE., cirro-stratus ESE., strato-cumulus NE.

(6) LINSTEAD.

By Mr. DUGALD CAMPBELL.

The place of observation was a mile north of the village. The storm began at 5:30 a. m., August 11, with the wind N. by E.; the wind gradually backed to NW. at 7 a. m.; there was a calm lasting about twelve minutes, and then the wind came from the SW. and S.; at 9 a. m. all was over.

(7) CHAPELTON.

By Mr. R. CRAIG.

One-tenth of an inch has been added to the readings of the aneroid (*L*) to bring them into accordance with other readings on the night of August 10.

August, 1903.	Aneroid.	Wind.
	Inches.	
10, 9 p. m.	29.08	light puffs.
11, 4 a. m.	29.05	nw.
11, 6 a. m.	29.03	w.
11, 7 a. m.	29.01	w. by s.
11, 7:40 a. m.	29.01	s. by w.
11, 8 a. m.	29.02	s.
11, 8:30 a. m.	29.03	s. by e.
11, 9 a. m.	29.03	se.
11, 10 a. m.	29.04	se.
11, 11 a. m.	29.05	se.

The wind was strongest from 7:40 to 8:30 a. m.

(8) LLANDOVERY.

By Mr. A. J. WEBB.

1903.	Barometric pressure.
August 11, 0 a. m.	29.87 inches.
6 a. m.	29 75
6:50 a. m.	29.58
7:05 a. m.	29.53
7:14 a. m.	29.48
8:15 a. m.	29.15
8:35 a. m.	29 33
10 a. m.	29.71
Noon	29.83

An aneroid was used. Between 7:14 and 8:15 a. m. the storm was at its height, but a broken window prevented the readings being taken in that interval. If a curve be drawn representing the fall of pressure with the time, it will be found that the lowest reading was 29.2 a little before 8 a. m. The strongest wind was from the NE.

(9) HANBURY, NEAR SHOOTERS HILL, MANCHESTER.

By Mr. S. T. SCHARSCHMIDT.

August, 1903.	Barometric pressure.	Wind.		Notes.
		From.	Miles per hour.	
	Inches.			
10, 6 p. m.	29.80	.....	.....	
10, 10 p. m.	29.80	.....	.....	
11, 4 a. m.	29.69	.....	.....	
11, 5 a. m.	29.63	.....	.....	
11, 6 a. m.	29.56	wnw.	19	
11, 7 a. m.	29.43	w. by n.	77	
11, 8 a. m.	29.35	w. by n.	14	Lowest reading.
11, 9 a. m.	29.48	wsw.	77	
11, 10 a. m.	29.56	s.	25	Between 10 p. m. and 11 p. m. two inches of rain fell.
11, 11 a. m.	29.64	sse.	10	
11, noon.	29.68	.....	.....	
11, 1 p. m.	29.69	se.	2	

The barometric pressure was deduced from the readings of an aneroid; 1.77 inches was added for reduction to sea level and instrumental error. The force of the wind was estimated by Beaufort's scale; the corresponding velocities are given.

(10) CHRISTIANA.

By Mr. T. C. GARRETT.

Wind and rain set in from the NE. at 11 p. m. on the 10th. At 5 a. m. on the 11th the wind was N. It gradually backed to NW. at 7 a. m. Then there was a lull for a quarter of an hour, when the wind recommenced from the W. At 8 a. m. the wind was SW., at 9 a. m. S., and finally SE. The strongest winds were from the N. and SW.

Fine cirrus bands were seen stretching N. and S. across the sky on the evening of the 10th.

(11) KEMPSHOT OBSERVATORY.

By Mr. A. MAXWELL HALL.

August, 1903.	Barometric pressure.	Wind.		Notes.
		From.	Force.	
	Inches.			
11, 5 a. m.	29.659	nw.	.....	
11, 7:45 a. m.	29.434	nw.	.....	
11, 8:15 a. m.	29.292	nw.	Hurricane	
11, 8:45 a. m.	29.097	wsw.	Hurricane	
11, 10 a. m.	29.323	s.	Hurricane	Lull at 9:15 a. m.
11, 10:30 a. m.	29.415	s.	.....	
11, 11 a. m.	29.522	s.	.....	
11, 11:30 a. m.	29.579	se.	.....	
11, noon.	29.650	se.	.....	
11, 1 p. m.	29.705	se.	.....	

The barometer used was a mercurial standard and the readings and the times may be regarded as thoroughly reliable, but the observer was quite inexperienced in cyclonic matters and paid more attention to the safety of the doors and windows of the houses than to the scientific part of the phenomenon, so that the very lowest readings were entirely omitted.

(12) BRANDON HILL, NEAR MONTEGO BAY.

By Mr. MAXWELL HALL.

August, 1903.	Barometric pressure.	Wind.		Notes.
		From.	Miles per hour.	
	Inches.			
10, 2 p. m.	29.874	ene.	15	Clear, very fine.
10, 4 p. m.	29.847	ene.	15	Clear, very fine.
10, 6 p. m.	29.837	ene.	3	Clear, a little cirrus se.
11, 6 a. m.	29.686	n. by e.	10	Rain, and scud flying fast overhead.
11, 7 a. m.	29.609	n. by e.	20	Heavy rain squalls.
11, 8 a. m.	29.520	nne.	50	Heavy rain squalls.
11, 8:15 a. m.	29.478	nne.	60	Heavy rain squalls.
11, 8:30 a. m.	29.427	nne.	60	Heavy rain squalls.
11, 8:45 a. m.	29.331	nne.	60	Very heavy squalls.
11, 9 a. m.	29.16	nne.	70	Very heavy squalls.
11, 9:15 a. m.	28.93	calm.	0	A break in the clouds; clouds ne. by n.
11, 9:30 a. m.	28.942	calm.	0	Plenty of light; clouds e. by s.
11, 9:37 a. m.	28.948	calm.	0	Clouds ssw.
11, 9:42 a. m.	28.991	ssw.	15	No rain.
11, 10 a. m.	29.173	s.	60	Wind steady; no rain.
11, 10:15 a. m.	29.273	s.	40	Wind steady; no rain.
11, 10:30 a. m.	29.359	s. by e.	10	Wind steady; no rain.
11, 11 a. m.	29.452	sse.	10	Rain.
11, noon.	29.602	se. by s.	10	Rain.
11, 1 p. m.	29.686	se. by s.	5	Light rain.

The barometer used was a mercurial standard. The very heavy squalls were estimated up to 80 miles an hour. The calm lasted 27 minutes, from 9:15 to 9:42 a. m. The readings at 9 and 9:15 a. m. were taken with an aneroid, as it was too dark to read the standard in the closed veranda. The temperature in the open veranda was 79° at 6 a. m. and again at 11 a. m.; it fell to 76° in the closed veranda at 9 a. m.

(13) SAVANNA LA MAR.

By Mr. J. F. BRENNAN.

August, 1903.	Barometric pressure.	Wind.		Clouds.		Notes.
		From.	Miles per hour.	Kind.	From.	
	Inches.					
10, 7 a. m.	29.89	ne.	12	1 cirrus.	ne.	Squally.
10, 10 p. m.	29.82	ne.	12	10 nimbus	?	Rain.
11, 7 a. m.	29.70	ne.	12	10 cumulo-nimbus	nne.	Squally.
11, 8 a. m.	29.59	ne.	12	10 nimbus	n. by e.	Rain.
11, 9:30 a. m.	29.46	nnw.	20	10 cumulo-nimbus	nw.	Rain.
11, 10:30 a. m.	29.47	sw.	20	10 cumulo-nimbus	sw.	Rain.
11, 11 a. m.	29.52	ssw.	30	10 cumulo-nimbus	ssw.	Rain.
11, 11:30 a. m.	29.57	se.	35	10 cumulo-nimbus	se.	Rain.
11, noon.	29.64	se.	35	10 cumulo-nimbus	se.	Rain.
11, 12:30 p. m.	29.67	se.	20	10 cumulo-nimbus	se.	Rain.
11, 1 p. m.	29.68	ese.	30	10 cumulo-nimbus	se.	Rain.
11, 5 p. m.	29.76	se.	30	10 cumulo-nimbus	se.	No rain.
11, 7 p. m.	29.79	se.	20	10 cumulo-nimbus	se.	Squally.

The barometric pressures were deduced from aneroid readings. The velocity of the wind was estimated.

III. GENERAL RESULTS OF THIS STUDY.

From the backing of the wind at Richings and at Vale Royal it appears that the center must have passed a little north of these places; also a little north of Linstead, Chapelton, and Christiana, south of Llandovery, but central over Brandon Hill, Montego Bay. A straight line from near the Morant Point light-house to Montego Bay satisfies these conditions, as shown in the accompanying chart, fig. 2.

From the observations made at Brandon Hill it appears that the worst part of the storm lasted for two hours,[2] from 8 to 10 a. m., and hence the computed diameter of the destructive area of the hurricane was not more than 40 miles. If, therefore, we draw two lines on the chart parallel to the course of the center, twenty miles north and south of the course respectively, the area of destruction will be bounded by these lines.

We now see why the south coast of Jamaica from Old Harbor to Savanna la Mar did not suffer; it was outside the limit.

Again, Montego Bay was fairly sheltered from the northerly and southerly winds, so that the town was not injured; and Lucea was sheltered from the northwesterly and southerly winds and also escaped; but all along the north coast from Manchioneal to Falmouth the wind was tremendous, and there was considerable loss of life among the falling trees and houses. In many low-lying places the wind drove the sea ashore; and there is reason to suppose that had the center been moving slowly instead of at the high rate of twenty miles an hour, there would have been appalling loss of life from the invading sea.

At Kingston and Port Royal the storm began between 2 and 3 a. m. with the wind, it is said, from the NE.; about 5 a. m. it shifted to the W.; at 5:30 a. m. there was a lull; the barometer began to rise, and the wind worked round to the SE. Port Royal did not greatly suffer; and the chief damage in Kingston was confined to the telegraph poles and wires. The Daily Gleaner gave the following account of the appearance of the city at 6 a. m. :

> At 6 o'clock Kingston presented a woful spectacle. The streets were utterly deserted. In some quarters there was not a sign of life. But on every hand stood out the evidences of the night's terrible visitation. Huge trees, landmarks of a score of years many of them, lay across the streets and lanes. Roofs of houses, broken windows, and fallen wires appeared in every thoroughfare. Right away up Orange street every telephone pole was down. Like so many broken masts they lay across the street, their net-work of wires in a tangled mass, all within reach of the hand. In some places the telephone, electric light, and tramway wires were mixed in inextricable confusion. All over the city it was the same. Streets and lanes were blocked by broken trees, fallen telephone poles, and other débris.

At Port Antonio the wind had been from the N. during the 10th, and it increased in violence until 3 a. m. on the 11th, when it blew a hurricane which lasted till 5:30 a. m. The wind was very violent; all the small and poorly built houses collapsed as a matter of course; several solidly built buildings, such as the hospital and the Tichfield School, were more or less destroyed, and of the five or six steamers in the harbor four or five were driven ashore. It may be inferred that full hurricane force was reached from the statement that trees were not merely blown down; they were uplifted with their roots and hurled along.

There was no lull. The nearest approach of the center to Port Antonio was fifteen miles, and according to the observation made at Brandon Hill the diameter of the calm area must have been about ten miles, so that at the nearest approach Port Antonio must have been ten miles from the northern edge of the calm area. No doubt the wind veered to NE. when the hurricane was strongest, and then to E. and SE.; but I have no note on this subject.

At Manchioneal the wind was equally strong. It commenced from the N., then veered NE., E., and SE., when it was said that "nothing could stand before its fury." The small town was destroyed. The houses, with very few exceptions, were either blown down or washed away by the waves, which came 100 yards ashore, and there was considerable loss of life.

Returning westward, Port Maria also suffered greatly. On the 10th the wind was from the N., and as night came on the wind increased. At 4:30 a. m. on the 11th the hurricane struck the town, and at 6:30 a. m. it was at its height. The sea rose, and in an incredibly short time it had swept over the entire eastern portion of Main street, across the Warner swamp land into Warner street, a thing unparalleled in the history of this ancient town.

At Falmouth the advance of the sea was so rapid that the correspondent of the Gleaner called it a "tidal wave," meaning, no doubt, one of those terrible waves due to earthquake shocks which often devastate the shores of countries liable to earthquakes. He writes:

> The whole seaboard was devastated both by the hurricane and the tidal wave, which rose some twenty feet and rushed with a deafening roar up the streets, carrying fishing canoes and other small craft more than one hundred yards up the streets.

From inquiry made on the spot it appears that the sea rose somewhat rapidly and then rushed ashore, so much so, that Inspector Toole had great difficulty in removing his family from his quarters in the old barracks, which as the sea rose he considered untenable, but there was no such "tidal wave" as described above.

A very large number of poorly built houses were destroyed, a great deal of damage was done to more substantial houses, and as many as fifteen sloops were driven ashore or sunk.

The wind veered from NW. around by N. to E. and SE.; the storm was at its height between 8 and 9 a. m.; the nearest approach of the center was seven miles, so that Falmouth was just outside the northern edge of the central calm, and of course there was no lull.

From these few and brief descriptions of the storm at different places some idea may be formed of the enormous amount of damage done within the storm area; all the large plantations of cocoa palms along the north side and at the east end were destroyed; all banana cultivations, wherever situated, were ruined for a time; and throughout the length and breadth of the island a large proportion of fruit, pimento, and coffee trees were damaged or destroyed.

The record of the tide gage at Port Royal is very interesting; by comparing the height of the water on the 11th with the corresponding heights on the 10th and 12th,[3] we get the results given in the following table:

		Inches.	
August 11,	0 a. m., water level	1	below mean.
	1 a. m., water level	7¼	below mean.
	2 a. m., water level	4	below mean.
	3 a. m., water level	¼	below mean.
	4 a. m., water level	6½	above mean.
	5 a. m., water level	11½	above mean.
	6 a. m., water level	13¼	above mean.
	7 a. m., water level	9	above mean.
	8 a. m., water level	5½	above mean.
	9 a. m., water level	6	above mean.
	10 a. m., water level	6¼	above mean.
	11 a. m., water level	4	above mean.

It then fell to the mean again as before midnight.

It, therefore, appears that an advancing hurricane produces a wave in the height of the level of the sea; the height first falls when the hurricane is 80 or 100 miles away, and then rises, the greatest rise taking place at the time of nearest approach of the center; in this particular instance, the fall below mean was seven inches and the rise above mean thirteen inches.

Now, during the evening and night of August 10, the wind

[2] At Fort de France, Martinique, it also lasted two hours.

[3] To eliminate the small tidal effect.

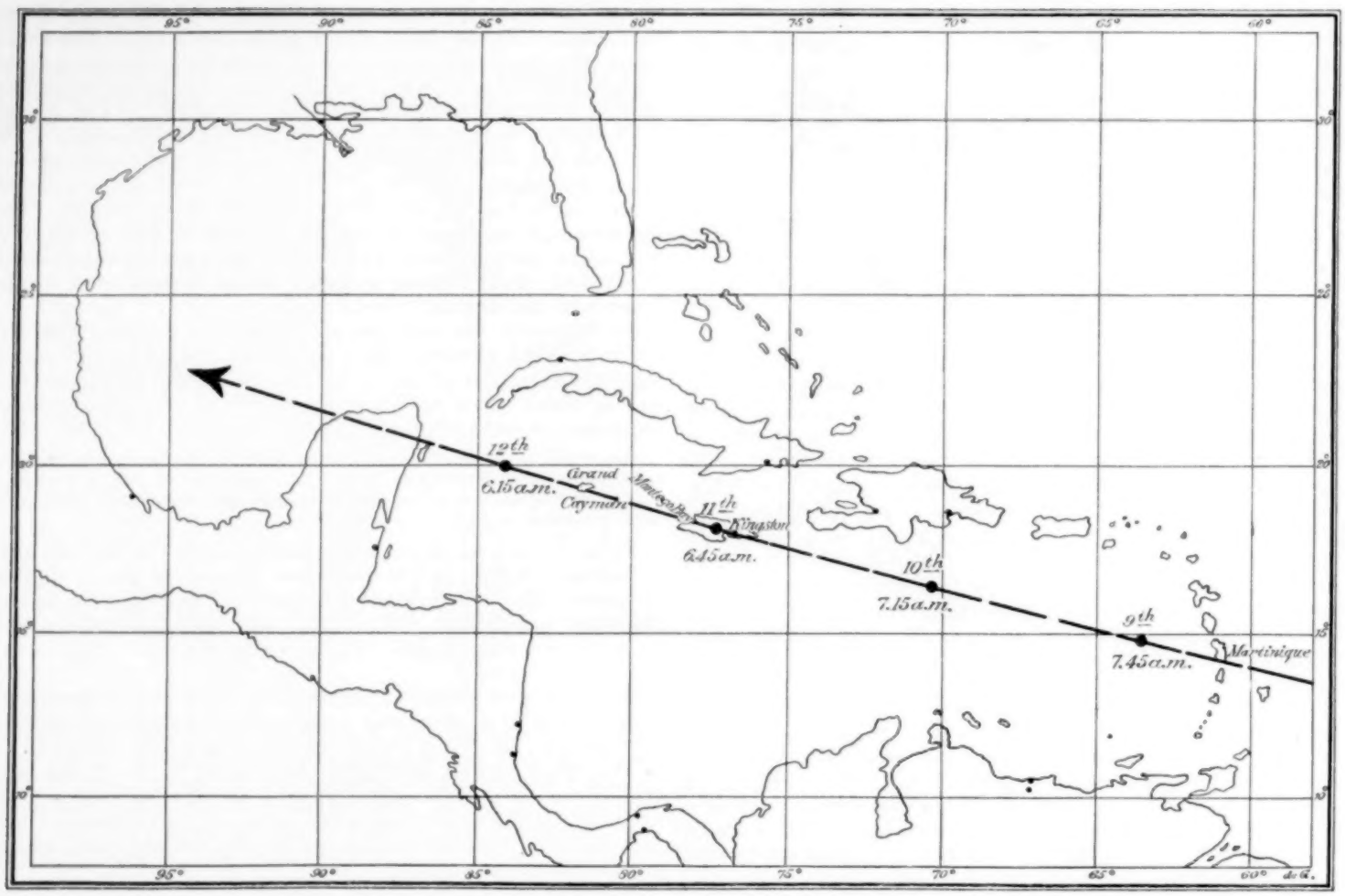

FIG. 1.—Position of the center of the hurricane from August 9 to 12, 1903, at Greenwich mean noon, with the approximate local times.

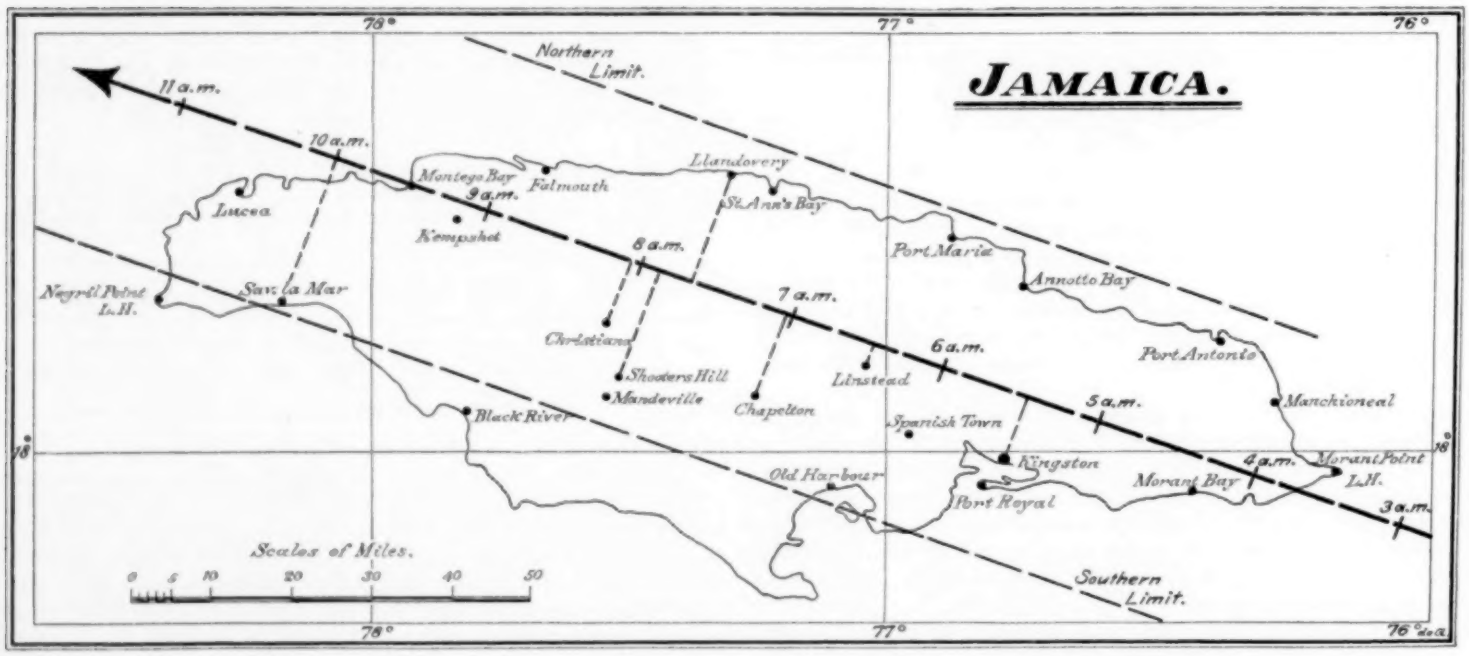

FIG. 2.—Positions of the center of the hurricane on August 11, 1903, for each hour of Kingston mean time.

set in from the N. at Manchioneal, Port Antonio, Port Maria, Falmouth, and no doubt at many other places on the north side of the island; this direction is in accordance with the cyclonic theory, but at Christiana, Montego Bay, and Savanna la Mar, the wind was NE.; so that the wind at these places had not yet felt the influence of the cyclonic center. Up to 11 p. m. on the 10th the wind was NE. at Christiana, when the center was 180 miles away, and we do not know when it backed to N.; if this was at 1 a. m., the center would have been 140 miles away.[4]

Now, as the wind had been N. nearly all day at Port Antonio, when the course of the center was much farther away, it is quite clear that the winds at places on the northern shore were far more susceptible to cyclonic influence than at places like Christiana, Montego Bay, and Savanna la Mar, where ranges of hills and forests interfered with the surface current; any local system of storm warning should embody this fact.

With regard to the NE. winds at Kingston and Port Royal at the commencement of the storm, it may be said that the wind at Kingston generally does show some irregularity as a hurricane approaches, due, I believe, to the Port Royal and Blue Mountain ranges, which rise to an average elevation of 5000 feet at a distance of not more than ten miles from Kingston, and protect the city and the harbor from all strong northerly winds.

The next point for consideration is the fact that the wind was much stronger on the north than on the south side of the island at the same distance from the center and within the storm area. It has been already noticed that the open sea allowed light winds to be readily affected by the cyclone at a great distance, but we are now considering the strength of the wind when near its full force.

Thus, at 6 a. m., there should have been a SSW. wind at Port Royal fully equal to any experienced on the north side of the island, which was not the case; and again at Savanna la Mar the wind never rose above 35 miles an hour. How is this to be accounted for?

The cyclonic theory no doubt presents many difficulties. Take, for instance, the motion of the calm area at the center; this is not produced by combining the motions of translation and rotation, for in that case the lowest pressure would not coincide with the calm area, which it invariably does. In the chart of this hurricane we could easily find a line south of the central line, where the wind was blowing from WNW. at twenty miles an hour; combining this with the velocity of the center toward the WNW. of twenty miles an hour, there would be a belt of calm far removed to the south from the belt of lowest pressure: but this was not the case.

Let C be the center of a cyclone, and let A and B be the positions of portions of the moving air in front and in rear of C, respectively:

$$A, \quad C, \quad B;$$

then we are to suppose that C was once at B, and that it will shortly be at A, and that the area of lowest pressure has proceeded from B to A with a wave-like motion, without thrusting the air in front of it or dragging it behind.

Dr. W. N. Shaw, Secretary of the Meteorological Committee of the Royal Society, has shown that if each portion of air within a cyclone simply moves at any instant in accordance with its position and distance from the center at that instant, then the effect of the motion of the center is to make the air (in such a cyclone as we are now considering) sweep in from the north to the central line and then turn sharply around the center, W., S., and SE., while the air south of the central line hardly approaches or even moves away from the center.

Consequently the mountain ranges referred to above and the ranges all along the middle of the island may have great effect in diminishing the strength of W., S., and SW. winds at places south of the central line, especially when the motion of the center is large.

[4] Corresponding to a fall below mean pressure of 0.17 inch.

JAPANESE METEOROLOGICAL SERVICE IN KOREA AND MANCHURIA.

By Prof. Y. WADA. Dated Chemulpo, Korea, August, 1905.

[Translated from the French manuscript, with notes by Dr. S. Tetsu Tamura.[1]]

Since the beginning of the recent Russo-Japanese war, our government, feeling the necessity of a special meteorological service along the coasts of Korea, established at first five meteorological stations, and has since then increased these to the number of nine stations, the approximate geographical coordinates of which are as follows:[2]

TABLE 1.—*Stations with approximate geographic coordinates.*

Localities.	Latitude N.	Longitude E.	Height.
	° ′	° ′	*Meters.*
1. Fusan	35 6	129 3	23
2. Mokpo	34 41	126 4	8
3. Chemulpo...	37 29	126 37	70
4. Wonson	39 9	127 26	3
5. Yongampo..	39 56	124 22	5
6. Tairen.....	38 55	121 34	5
7. Yinkow.....	40 40	122 14	3
8. Mukden	41 48	123 23	57
9. Josin	40 40	129 20	4

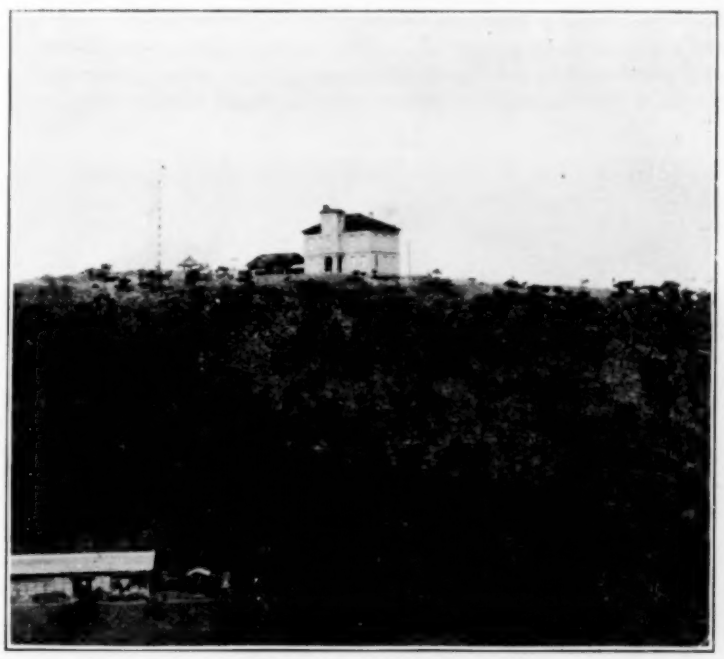

FIG. 1.—The Chemulpo Meteorological Observatory.

Besides the stations above mentioned, there are four others which are at the same time marine semaphore stations.

The Chemulpo Meteorological Observatory is of the first order, and the other eight stations are of the second order

[1] Ever since 1879 Professor Doctor Wada has been connected with the meteorological service in Japan, and has been for many years the chief of the service of predictions in the Central Meteorological Observatory. Japan owes a great deal to him for his important investigations of meteorological conditions in Japan and for the organization and completion of our weather service. At the beginning of the recent Russo-Japanese war Professor Wada was entrusted by the Japanese Government with the organization of a similar system in Korea and Manchuria, and is now completing the work as the chief of that service.—*S. T. T.* [We are pleased to be able to add his photograph to this note.—ED.]

[2] Three new stations, at Port Arthur, Nikoloisk, and Alexandrosk, were added at the moment of sending this note.

TABLE 2.—*The results of observations of the meteorological elements since the founding of the Chemulpo Observatory.*

Month and year.	Atmospheric pressure.*	Air temperature in shade.				Relative humidity.	Vapor tension.	Cloudiness.	Quantity of water.		Wind.		Number of days.									Min. <0°	Mean <0°	Max. <0°	Max. >30°
		Mean.	Absolute max.	Absolute min.	Mean range				Precipitation.	Evaporation.	Mean direction.	Velocity.	● ✳ ▲ △ ▲	◪	≡	⌴	⌯	◴	Clear.	Cloudy					
	mm.	°C.	°C.	°C.	°C.	%	mm.	0–10	mm.	mm.		m.s.													
May, 1904	759.4	14.2	23.8	8.8	6.9	81	10.4	5.0	50.5	.....	s.41° w.	3	14	1	2	3	0	2	0	9	6	0	0	0	0
June, 1904	756.4	19.7	30.3	12.6	7.6	80	13.5	5.8	34.6	124.3	s.48° w.	4	7	0	3	5	0	6	0	6	12	0	0	0	1
July, 1904	755.7	23.5	32.8	17.0	6.3	83	17.9	7.3	293.7	100.7	s. 5° e.	3	21	0	0	2	0	1	0	4	18	0	0	0	6
August, 1904	756.5	25.5	33.3	17.5	7.5	82	19.8	3.9	117.4	134.0	s.20° w.	3	9	0	0	0	0	5	0	11	6	0	0	0	18
September, 1904	760.3	20.8	30.1	11.1	8.7	72	13.3	4.2	17.1	120.6	n.25°w.	3	5	0	0	1	0	0	0	11	5	0	0	0	1
October, 1904	765.2	13.7	27.5	1.3	9.0	72	8.6	4.2	25.6	91.5	n. 18° e.	3	8	0	1	0	0	2	0	10	6	0	0	0	0
November, 1904	766.4	5.9	16.6	— 4.1	8.0	68	5.1	3.2	16.9	70.9	s.59° w.	3	6	1	1	1	4	4	0	13	3	9	2	0	0
December, 1904	768.7	0.4	13.3	— 9.6	6.8	65	3.3	3.7	11.5	71.5	s.44° w.	3	5	4	0	1	15	1	0	12	2	23	18	6	0
January, 1905	765.5	0.9	8.5	—11.4	6.0	76	3.8	4.3	13.1	59.0	n. 1° e.	4	6	2	0	4	19	6	0	10	7	19	7	5	0
February, 1905	767.4	— 3.1	4.6	—13.1	6.6	63	2.3	3.6	2.4	65.7	n. 4° e.	6	4	0	0	0	13	11	0	9	4	28	25	10	0
March, 1905	767.8	4.9	15.6	— 4.7	8.1	57	3.7	5.0	2.5	127.4	n. 22°e.	6	4	0	0	2	5	14	0	6	7	15	9	0	0
April, 1905	762.5	8.6	22.3	0.3	8.9	66	5.5	5.7	24.5	155.1	n 66°w.	7	8	0	0	3	0	11	0	7	11	0	0	0	0
May, 1905	758.9	13.8	28.3	6.6	7.8	76	8.9	6.2	148.3	134.1	s.55° w.	6	9	0	1	9	0	13	0	7	16	0	0	0	0
June, 1905	755.3	19.4	27.9	12.6	7.3	79	13.0	6.5	60.0	175.6	s.64° w.	5	11	0	0	6	0	5	0	3	12	0	0	0	0
July, 1905	754.7	23.4	32.6	16.7	5.2	87	18.6	8.1	257.8	131.0	s.25° w.	5	17	0	2	12	0	5	2	0	19	0	0	0	1

* The barometric pressures have been reduced to sea level and standard gravity. The correction for gravity is +0.52 mm.

and subordinate to the former. These stations make six observations daily, at 2, 6, 10 a. m., and 2, 6, 10 p. m. on one hundred and thirty-fifth meridian time (east of Greenwich). Each station is provided with a Fortin barometer, an August psychrometer, a maximum thermometer, a minimum thermometer, a Robinson anemometer with electric device, a vane, a pluviometer of two decimeters (eight inches) diameter, an atmometer of the same diameter, a Jordan heliograph or sunshine recorder, a Richard barograph, a Richard thermograph, and a Richard hygrograph. The central Chemulpo Observatory possesses in addition, an anemograph, an anemo-cinemograph, a pluviograph, a micro-seismograph, earth thermometers for different depths and a sufficient number of accessories and apparatus, such as marine chronometers, a theodolite, a sextant, photographic apparatus, etc.

The Chemulpo Meteorological Observatory and the whole meteorological service in Korea are under the direct supervision of the present writer as the chief of the service; we receive every day telegraphic reports of three meteorological observations at 6 a. m., 2 p. m., and 10 p. m. from the principal stations in Japan and from those in Korea and Manchuria, with the addition of telegrams twice a day from Tientsin, Chefoo, Zikawei, Nankin, Hangchow, Hankow, Shanshi, Amoy, and Manila. Thus it will be seen that the reports abundantly suffice to enable this observatory to give weather predictions and storm warnings to semaphore stations, as well as to the centers of military and naval operations.

The building for the observatory, constructed temporarily and opened since the beginning of this year, 1905, is situated on a little hill quite near the Japanese concession at Chemulpo, at the mouth of the Kanko River.

The results of the observations of the principal meteorological elements since the founding of this observatory are given in Table 2.

Table 3 gives the results of observations made at the Korean custom-house in Chemulpo, during the years from 1887 to 1903, as compiled at the new Japanese meteorological observatory at Chemulpo.

All the meteorological stations on Korean and Manchurian coasts issue the weather predictions at 4 p. m. every day, and hoist the proper flags on the signal staff. The signals now employed are as follows:

A. Wind signals.

a. Triangular white flag for northerly winds.
b. Triangular green flag for easterly winds.
c. Triangular red flag for southerly winds.
d. Triangular blue flag for westerly winds.
e. Coronet, partly red and partly white, for gales.

B. Weather signals.

a. Rectangular white flag for fair weather.
b. Rectangular red flag for cloudy weather.
c. Rectangular blue flag for rainy weather.
d. Rectangular green flag for snowy weather.

C. Temperature signals.

a. Red pennon for warmer weather.
b. White pennon for colder weather.

The observatory issues storm warnings when an atmospheric disturbance is expected on or near the coasts of Korea and

FIG. 2.—Professor Doctor Wada.

TABLE 3.—*Result of observations made at the Korean custom-house in Chemulpo, during the years 1887 to 1903, inclusive.*

Month.	Air temperature in degrees centigrade.							Number of days with—						Amount of rain or snow.
	Mean.	Absolute maximum.	Date.		Absolute minimum.	Date.		Maximum temperature. ≥ 30° C.	Maximum temperature. ≤ 0° C.	Minimum temperature. ≤ −10° C.	Fair weather.	Cloudy weather.	Rain or snow	
			Day.	Year.		Day.	Year.							
														mm.
January	− 2.7	13.3	19	1903	−18.0	19	1897	.....	24	20	27	4	10	27.1
February	− 1.2	17.8	15	1895	−18.5	2,3	1895	.....	12	11	26	2	7	22.0
March	4.0	19.4	30	1898	−10.0	2	1898	.....	3	1	26	5	8	28.7
April	10.2	27.2	24	1901	− 7.0	11	1900	.....	.....	.....	25	5	6	63.7
May	15.6	31.1	19	1896	4.0	4	1893	1	.....	.....	26	5	7	77.9
June	20.1	33.3	30	1894	9.0	12	1902	3	.....	.....	24	6	8	117.4
July	24.1	35.7	?	1887	11.6	?	1891	20	.....	.....	22	9	12	183.8
August	25.3	36.7	1,5	1894	15.0	25	1902	26	.....	.....	24	7	13	175.9
September	21.2	32.8	4	1901	7.3	?	1888	4	.....	.....	25	5	8	103.5
October	15.1	29.9	?	1890	− 1.7	?	1889	.....	.....	.....	30	1	4	38.5
November	7.7	21.1	2	1902	−10.3	27	1891	.....	3	.....	28	2	6	38.3
December	0.0	15.0	26	1900	−17.0	29	1901	.....	15	8	27	4	11	35.0
Year	11.6	.....	.....	.....	.....	.....	.....	54	57	40	310	55	100	911.8

Manchuria. On receiving them, all the stations immediately display the warning by proper signals on the mast which is painted red and white alternately. Fuller information is obtainable at the signal stations.

The cautionary signals now employed are as follows:

A. Day signals.

a. Red ball indicates that the coast is warned of the approach of threatening weather.

b. Red cylinder indicates the expectation of stormy weather.

c. Red cone announces the approach of cyclonic storm of great intensity.

d. White double cone is hoisted when severe storm is expected in some other districts.

B. Night signals.

a. Red light is employed for a ball.

b. Green light for a cylinder.

c. Green light above a red one for a cone.

d. White light for a double cone.

NOTES AND EXTRACTS.

DR. JULIAN APARICIO.

The death of Dr. Julian Aparicio, who for the past ten years has rendered very important services to science as Director of the National Observatory, San Salvador, Central America, is announced by his successor, Dr. Santiago I. Barberena.

The annals of this observatory have been published rather irregularly. The volume for 1895 appeared in 1901, containing 53 folio pages and giving the observations in extenso. The late director, Julian Aparicio, C. E., was the successor of Dr. A. Sanchez, who seems to have begun in 1891 the regular daily publication of observations in extenso followed by an annual summary, so that the volume for 1894 included 62 pages. A summary of the observations for 1892 is given in the Meteorologische Zeitschrift for 1895, page 228. These publications seem not to be very widely disseminated and a general review of the climatology of San Salvador would be a very welcome contribution to the MONTHLY WEATHER REVIEW.

PIETRO TACCHINI.

Prof. Pietro Tacchini, Chevalier of the Civil Order of Savoy, was born March 21, 1838, at Modena and died March 24, 1905, at Spilamberto, near Modena. After a broad activity in astrophysics at the observatories of Padua, Modena, and Palermo, he was in 1878 appointed successor to Secchi as director of the Astronomical Observatory at the Collegio Romano [distinct from the Vatican Observatory] and in 1879 director of the general Italian service for meteorology, astronomy, and geodynamics. A large number of special memoirs have been published by him in addition to the important work that he did in organizing and carrying on every branch of work relating to terrestrial physics, i. e., meteorology, magnetics, seismology, vulcanology, oceanology. His personal interest was, perhaps, most especially occupied with solar physics and seismology. In 1870 Tacchini and Secchi united in founding the Society of Italian Spectroscopists.

In 1882 he succeeded Cantoni as a member of the International Meteorological Committee, and remained prominently associated therewith until the termination of his official meteorological career in 1900, when he retired from public office and devoted his time to solar observations.

Tacchini was the first organizer and director of the Ufficio Centrale di Meteorologia, to which geodynamics was subsequently added, and that institution was largely built up through his efforts. It will also be remembered that the founding of the astrophysical observatories of Catania and Etna was due to his initiative. In 1871 he first pointed out to the Italian Government the desirability of establishing an astrophysical and meteorological observatory on Etna, and the necessary authority was finally obtained in 1878. Instead of one observatory, Tacchini established two; one near the summit of Etna and the other in the city of Catania, at the foot of the mountain.

For 33 years Tacchini was the director of the Società degli Spettroscopisti Italiani, and the editor of its memoirs. In 1895 he founded the Società Sismologica Italiana.

Although not personally acquainted with Tacchini yet the Editor is able to quote the general testimony of many others as to his remarkably affable character and fairmindedness toward all with whom he came in contact. His enthusiasm was contagious and he inspired all with the desire to do their best in their chosen fields of work. His devotion to pure science influenced the Italian Government to slightly abate its hostility to the Collegio Romano.

ROBERT AUGUST BILLWILLER.

We learn with regret of the death of Prof. Robert August Billwiller on August 14, 1905, at Zurich, Switzerland.

Doctor Billwiller was born August 2, 1849. He studied in Basle, Zurich, Göttingen, and Leipsic. As the outgrowth of his enthusiastic work at the Observatory of Zurich during 1872–1881, where he had, among other things, introduced daily telegraphic reports and forecasts in 1878, there resulted the formation of the Central Meteorological Institute of Switzerland in 1881, with himself as director—an institution that represented the whole Republic—25 annual volumes of its annals have been published. Billwiller also organized the Swiss Alpine Club which, in 1882, established the famous mountain station on the summit of the Säntis, and maintained it until the expense was undertaken by the State. Since 1891 Billwiller has been an active member of the permanent committee of the International Meteorological Congress. His life and influence were devoted to the development of meteorological observations and research.

TORNADO AT CARBONDALE, PA., AUGUST 30, 1905.

Immediately after the tornado of August 30 at Carbondale, Pa., Mr. William M. Dudley, official in charge at Scranton, which is about sixteen miles southwest of Carbondale, issued a circular of inquiry and compiled a description from which we make the following extracts. He also obtained a special report, with photographs, by Mr. F. B. Hamilton. Three of the latter we reproduce. These views show the main points of interest in Dundaff or the western part of Carbondale.

Carbondale, Pa., a town about sixteen miles to the northeast of Scranton, Pa., was visited by a tornado of marked severity at about 8:30 p. m. The funnel-shaped cloud, from which vivid lightning played, moved across the northern portion of the city mostly, but its general course was from the southwest to the northeast, covering a track 2 miles in length and from 25 to 200 yards in width. Most of the damage was done in the northwest and northeast portions of the city. It is estimated that about 30 houses, barns, and sheds were blown down. A number of buildings were unroofed, some roofs being blown as far as 600 feet distant, causing the streets in the path of the storm to be littered with débris. Trees blown down fell to the eastward. From responses to a circular letter issued to the surrounding country, the information is gathered that this storm was confined to Carbondale, Pa., although rain, with high north to west winds and vivid lightning, occurred at a number of points in the vicinity. In most instances the rain was light.

FIG. 1.—This view shows a dwelling situated on a street at right-angles to 42d street. The dwelling was moved in line with the direction of motion of the tornado. The fact that the chimney stands would suggest good construction.

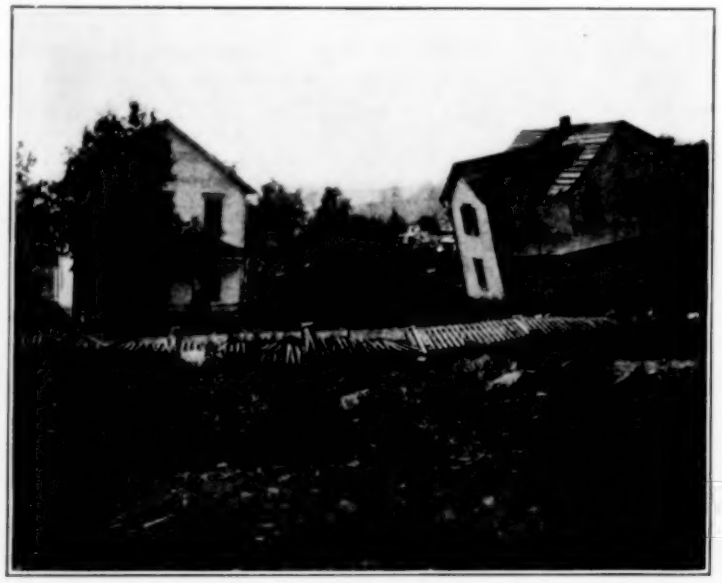

FIG. 2.—This is a front view of the house shown in the preceding figure. The fronts are on the lee side, both buildings have moved in the line of storm travel, both have been moved from their foundations and both have moved toward each other. This suggests the possibility that the storm center may have passed between the houses and moved them inward by suction. The picket fence in the foreground which is overturned consisted of posts set into heavy stone anchors.

FIG. 3.—This house faces the wind and the view was taken from the side of the house on the opposite side of the street and which was damaged in a manner similar to the house at the right. This might suggest that the tornado had a bounding movement.

At Scranton, Pa., at this time, vivid lightning was observed to the north, and a light sprinkle of rain fell from 8:50 to 9:50 p. m. to the amount of .01 of an inch. No special characteristics were observed here, the barometric pressure at 8 p. m., while low, 29.64 inches, continued even, and there was no noticeable increase in the wind velocity.

Mr. W. S. Bonham, postmaster at Simpson, Pa., just a few miles to the northeast of Carbondale, Pa., writes as follows: "The tornado commenced at Old Saw Mill on Fallbrook Road, one mile west of Carbondale, Pa., tearing it down completely. Then it took an easterly course over a hill to 42d street, tearing down and completely demolishing one house, furniture and all. The storm continued eastward in its track, upsetting and taking off their foundations five or six other houses. Continuing in its eastward track to the Delaware and Hudson and Erie Railroad yards, upsetting loaded cars of coal, tearing off roofs of two box cars and upsetting same; also took roof off company's barn and two Delaware and Hudson offices in yard. The storm then crossed the Lackawanna to the

east side, tearing two barns to pieces, also taking off of foundations two other barns. It then moved to the very northeasterly side of Carbondale, Pa., and tore to pieces one more barn. The path of destruction was about one and three-quarter to two miles in length and about 25 to 200 feet in width. One mile south of Simpson, Pa., the cloud was white, resembling steam somewhat, the top of the cloud being very dark, funnel-shaped, turning backward, or to fully illustrate, it was turning the same way you would turn a brace and bit if you were turning it out or backwards. The electric flashes issued from the funnel cloud. No hail at all, and only a few large drops of water. The noise was very peculiar, sounding like large quantities of water slashing and splashing, and also a heavy rumbling noise. Uprooted trees fell mostly toward the east. No persons or animals killed by the storm. No hail reported at any place in the vicinity."

MOHN'S RESULTS OF NANSEN'S NORTH POLAR WORK.

The results of the Norwegian North Polar Expedition of 1893–1896 organized and led by Fridtjof Nansen are being published in a series of handsome quarto volumes at the expense of the "Fridtjof Nansen Fund for the Advancement of Science." This fund is said to be essentially the money derived by Nansen from his numerous popular lectures in America and Europe and therefore analogous to the "Tyndall Fund" in the United States.

Volume 6 of the series is devoted to meteorology which is considered as No. XVII of the classified list of subjects under which Nansen's scientific observations are being studied. The magnetic, hydrographic, and biological work will undoubtedly be as interesting, if not as important, as the meteorological work. The latter was pecularily favored by the long imprisonment of the *Fram* in the ice, so that we have three years of observation under practically uniform conditions. The observations were carried out with indefatigable industry and faithfulness by Nansen's sailing captain, Sigurd Scott-Hansen, and his assistants, Capt. Hjalmar Johansen and Mr. Bernard Nordahl.

Technical meteorologists will especially appreciate the fact that the material accumulated on this voyage has been prepared for publication and in every respect admirably discussed by Prof. H. Mohn, the eminent director of the meteorological service of Norway. In addition to atmospheric observations proper, hydrography was also included in the scheme of work and the temperature of the sea surface in the open sea, and of the ice at different depths are fully recorded. The temperature of the sea water belongs to volume 3, but the temperature of the polar ice is properly considered as belonging to the meteorological data of volume 6. The journal of observations occupies 225 pages of this volume and is followed by about 400 pages of results, subdivided into chapters on the winds, pressure, temperature, moisture, clouds, precipitation, and fog, and optical phenomena. These are followed by chapters on the general relations of the observations made on the *Fram* to the general distribution of the temperature of the polar ice, the arctic areas of pressure and temperature, the diurnal and annual periods of meteorological elements in the arctic circumpolar sea.

The polar charts of the isotherms, isobars, and isabnormal lines for each month of the year for the Arctic region north of latitude 60° are based upon all data given by polar explorers and therefore replace the older preliminary efforts in that line of study. The chart showing the annual range of air temperature indicates four centers of maximum range, viz, central northern Siberia, central North America, central northern Greenland, and Lapland, where the annual ranges are respectively 66°, 45°, 40°, and 30° centigrade. The hypothetical annual range at the pole itself is 42° and this polar value would doubtless be included within the central north Greenland area whose maximum is 40° if we had a longer series of observations.

The charts of isobars show that the pressure at the pole itself will vary between 762.5 mm. in January, February, March, and April, and 759.0 mm. in June, July, August, and September.

The charts of isotherms show that the mean polar temperature is about —40° C. in January and February, 0° C. in July, —38° in December. The isabnormal line 0° necessarily passes through the pole in each month of the year, the warmer region is on the Atlantic side of the zero isabnormal throughout the year and the colder region lies toward Bering Strait, Alaska, and eastern Siberia also throughout the year.

The annual isotherms show an average temperature of —20° C. throughout the interior of Greenland and the central part of the arctic ice region extending to 15° from the pole toward Bering Strait.

Professor Mohn very properly states that the point of most importance in this whole series of observations is the fact that the surface of the earth during the whole time was of a unique homogeneous nature consisting of a level of frozen water with an uninterrupted free horizon. The distance from continents or islands was always considerable; although there was a change in latitude and longitude, yet the environment of the *Fram* was always so similar that the factors having an influence upon the climate may be regarded as a function mainly of the latitude and only slightly of the longitude. The entire drift of the *Fram* from August, 1893, to April, 1898, included three periods of about four months each of continuous night and also three periods of about four and a half months each of continuous day. These alternations, of course, gave abundant opportunity for distinguishing between the effects of sunshine and terrestrial radiation. In discussing the individual elements, winds, pressure, etc., certain anomalies were discovered as to diurnal and annual periods which could only be elucidated by a consideration of the atmospheric conditions in the whole Arctic region.

Professor Mohn states that the great distance between the *Fram* and any permanent or temporary meteorological station made it quite impossible to construct daily synoptic weather charts by means of which to study the influence of moving cyclonic and anticyclonic systems. He has however utilized the observations on the *Fram* in the light of our knowledge of the laws of cyclonic motion taking account of the coefficient of friction deduced from European observations and has tabulated the resulting computed bearings of the centers of low pressure and their motions. During three years the *Fram* came within the sphere of influence of at least as many as 73 moving areas of low pressure. The maximum number being in January and the minimum in June. The average duration of the passage of a depression was about four days. The lowest pressures at the *Fram* station during the passage, of a depression varied from 771.7 mm., which was the highest, to 724.1 mm., which was the lowest, and both occurred in February. The average heights of the low pressure were a little higher in winter than in summer, which is of course quite a contrast to our experience in the United States, but as the *Fram* was not generally at the center of a low pressure this can only be an approximation to the true average low pressure. There were, however, ten cases in which the center passed over the vessel. Of these the three lowest pressures were 726.0 mm., 727.3 mm., and 728.2 mm. The velocity of the wind observed during the passage of these depressions was not great. The highest being 18 meters per second, or about 40 miles per hour. The average velocity for the whole drift was 4.5 meters per second or 10 miles per hour. Judging from these velocities of the wind the track of the *Fram* can not be considered as a very stormy one. The centers of the depressions moved mostly toward the east-northeast and generally between southeast and northeast, but occasional tracks were toward each point of the compass. There was a preponderance of tracks on the westerly side of the *Fram*. During the first winter they lay chiefly north of the *Fram*, and in the

last winter they were south of the *Fram*, so that the general mean direction of the tracks for latitude 82° north and longitudes between 20° east and 140° east is nearly due east.

On page 586 Mohn has made an interesting computation, which he requests us to look upon as a mere experiment, in which he attempts to deduce a connection between the rate of movement of a barometric minimum as a whole and the wind velocity and barometric gradient. From this calculation he concludes that we should expect a rate of 12 or 15 meters per second, or 647 to 809 miles per day, for the centers of low areas in the Arctic Ocean. On page 588 Mohn gives an elaborate mathematical study of the peculiarities of the diurnal and annual periods of the meteorological elements in the arctic circumpolar sea. The main factor to be considered is the heat received by radiation from the sun, and the amount of this heat he computes in detail month by month, as also the sum total of the radiation from the sky and the loss of heat by radiation, utilizing the previous computations of Maurer and Angot. Mohn's effort to compute these quantities is ingenious and suggestive, and will undoubtedly stimulate others to publish analogous computations that have been made. He is quite right in saying that the diurnal variation of the total radiation effect is the chief factor that determines the periods of the various meteorological elements. The principal meteorological effect of the radiation from the sun and sky above us is the heating of the atmosphere and of the surface of the earth. The radiation of heat from the surface of the earth is always going on, but must vary with the cloudiness or clearness of the sky. With an overcast sky the radiation from above is screened off, and the radiation from below is radiated back to the surface of the earth. The radiation from the twilight sky has an appreciable heating power, and acts as a "heat twilight," as it is called by Dove.

During the long winter night, when the sun's rays do not strike the earth or the ice in the neighborhood of the *Fram*, they do, however, pass through the atmosphere at some distance above sea level, and even when they make a scarcely perceptible twilight they are still effective in warming up incipient precipitation at great altitudes and in maintaining a clear atmosphere with a blue black sky where there would otherwise be a slight haze. Radiation takes place more easily through such a clear sky. Consequently the local temperature has a tendency to fall during arctic winters when the sun is near the meridian, and this is clearly brought out by Mohn's computations. Therefore, we may say that the diurnal periodicity of temperature during clear days in midwinter is inverse to the diurnal period during such days in midsummer. This minimum of temperature during the winter twilight is entirely analogous to the minimum that occurs in temperate zones in the early morning twilight, and even sometimes after sunrise on the clearest days at high altitudes.

The diurnal period in the velocity of the wind is due to this diurnal period in the resulting radiation effect, and the observations of wind and radiation harmonize therewith, but the annual period of the velocity of the wind does not seem to depend on the annual period of the total radiation, as other factors become important, such as the extent of the areas of cloud and fog, the annual change of the general circulation of the atmosphere, the annual change in the distribution of vertical temperature gradients. Mohn especially calls attention to the need of careful anemometric observations in the polar regions at the topmast for comparison with those near sea level.

The diurnal variation of vapor tension is distinctly shown by the observations. There is one maximum after noon and one minimum late at night. "The diurnal ascending currents are too weak to carry the vapor upwards at a rate sufficient to produce a secondary minimum at the warmest time of the day." On the other hand the diurnal period of the amount of cloud is also distinct, there being a greater amount in the daytime than in the nighttime, so that the diurnal ascending currents must be strong enough to produce this diurnal period in the cloudiness. The probability of precipitation is greater in the daytime than during the nighttime.

METEOROLOGY IN SOUTH AMERICA.

CHILE.

Referring to an article under the title Meteorology in Chile, that will be found on page 326 of the MONTHLY WEATHER REVIEW for 1904, we are informed that meteorological work in Chile, after being for a long time divided between the national Astronomical Observatory at Santiago and the Central Meteorological Office connected with the Navy Department of the Republic of Chile, has now been subdivided and will hereafter be carried on by the following institutions:

1. "The Hydrographic Office of the Navy Department, at Valparaiso," which will have charge of ocean meteorology.
2. "The Section of Meteorology of the Administration of the Maritime District, Valparaiso," which controls the light-house stations of Chile and takes the place of the former Central Office at Santiago; it will have charge of coastal meteorology.
3. "The Section of Meteorology of the Astronomical Observatory of Santiago," which has charge of the meteorological stations established in the public schools in the provinces. The observatory will doubtless also have charge of higher scientific research in meteorology.
4. "The Weather Office connected with the Agricultural School of Santiago," which is under the Ministry of Industry. This weather office was established for the study of climate and meteorology in their relations to agricultural industries. This office issues a daily weather map based on observations taken at 4 p. m., Santiago time. It is expected that a special system of observations at 12 noon, Greenwich time, will soon be organized, and that a monthly bulletin will be published.

While this subdivision will give opportunity for the development of the scientific ability of many officials, yet it may also lead to a diversity of methods, and to a dissipation of energy and money that may not redound to the advantage of meteorology.

It would seem that while stimulating individual ability, the citizens of the Republic of Chile may lose the advantages that flow from the recognition of some central authority. Thus we find meteorological observers in that country writing to the Weather Bureau of the United States asking for the privilege of cooperating with it, whereas the true interests of meteorology would require the most hearty cooperation among themselves and with the excellent services in the adjoining countries, Peru, Brazil, and Argentine Republic.

Whatever may be the political, local, or commercial jealousies that prevade neighboring countries there can be no doubt that meteorology demands the most perfect scientific harmony; its field is the world. All in North and South America who would advance the study may well profit by the experience of meteorologists in Europe, where climatological observations and daily telegrams are neutral matters so far as they are affected by ordinary military conditions, and where international conventions labor to bring about perfect conformity with the present state of physical science.—*C. A.*

Mr. Lucio Alonso Villalobos, a wealthy merchant of Iquique, Chile, informs the Chief of the U. S. Weather Bureau that he has ordered meteorological apparatus from Europe and magnetic apparatus from Shanghai, China, and intends to establish "the best observatory in South America." He con-

templates ordering the captains of his sailing vessels, going to Hamburg and back by way of Cape Horn, to keep careful records that he will himself reduce and publish. The U. S. Weather Bureau will be pleased to cooperate with him.

PERU.

The American consul at Callao, Peru, under date of April 7, 1905, advises the U. S. Department of State that by decree dated March 31, 1905, the Government of Peru will at once establish meteorological stations at the following points:

Puira, Chiclayo, Ica, Moquegua, Cajamarca, Jauja, Huancavelica, Ayacucho, Cuzco, Puerto Barmudez.

The apparatus for these stations has already been purchased abroad and their work will be done under the direction of the Minister of Public Works. At some future date other stations will be established at Trujillo, Chachapoyas, Huánuco, Morocachas, and Abancay.

Next to Argentina, Chile, and Brazil, Peru seems to be most progressive in meteorological matters. Long before the establishment of a government service, as chronicled above, private parties were active in taking and recording meteorological observations.

The most important observatory in Peru seems to be the Harvard College Observatory at Arequipa. Observations at this station and its several secondary stations are published in the Annals of the Astronomical Observatory of Harvard College.

In 1892 the Academy of Medicine of Lima built a meteorological observatory, called Unanue and equipped it as a first order station. Its records, and the records of observations by correspondents of the Sociedad Geografica de Lima, are published in full in the Boletin of that society. Among the places for which such records have been published are San Ignacio, Department of Arequipa, and also the Instituto Agricola Salesiano at Arequipa.

ARGENTINE REPUBLIC.

The transfer of the Central Meteorological Office from Cordoba to Buenos Ayres, some account of which was given in the MONTHLY WEATHER REVIEW for 1902, page 315, has, as is well known, been followed by the publication of a very important daily weather map covering a region from latitude 22° south to 56° south, that is to say the whole of Terra del Fuego and Argentina as well as portions of Paraguay, Uruguay, and Brazil. The observations are made at 8 a. m. of the sixtieth meridian of Greenwich noon, except 6 a. m. in Paraguay. Unfortunately the extensive region on the chart covered by Chile is blank, and some of the observations from Brazil are a day late but so far as the Argentine Republic is concerned the tabular data and the chart give a more complete view of the atmospheric conditions than is usual. The data for upper clouds are especially appreciated. A small inserted map extends the main chart northeastward through Brazil to the equator. We see therefore on one map the low pressure belt of the equator, the low pressure area of the Antarctic region, the intermediate high pressure of the Tropic of Capricorn and the occasional passages of small areas of high pressure or low pressure across the meridians of 50°, 60°, and 70° west.

The charts are usually sent us in packages by months. For the month of May, 1905, we find a decided area of low pressure moving eastward from the 3d to the 9th, in latitude 45° on the west coast to 40° on the east coast, after which slow movement it then goes more rapidly to latitude 30° off the coast of Brazil, followed as in the United States by an area of high pressure whose pampero winds pour downward from the Andes over the plains of Argentina and Brazil generally from the southwest and corresponding to the dry, cool northwest winds of North America. On the 15th a second area of low pressure appears at latitude 42° S. on the west coast while a similar one is on the east coast, but a large area of high pressure comes in between with strong southerly winds shifting to northerly. To those accustomed to the maps of the Northern Hemisphere there would seem to be anomalies and confusion for a few days that can only be explained as due on the one hand to the continuous long narrow range of the Andes on the west, and the close proximity of the Atlantic coast on the east.

It would seem that at an elevation of 10,000 feet or more a rapidly moving layer of air from the west strikes the great mountains and plateaus and curls down most unexpectedly upon the lowlands of the east. Unfortunately, although the quantities of the upper and lower clouds are carefully given, yet the direction of their motion is not given by these charts so that our hypothesis remains to be tested by the observed movements of the clouds; it is, however, confirmed by the appearance of the isotherms and the gradual transition from clear weather to rain. By the 20th our low area had become a well-defined low in southern Brazil and another area of high pressure came pressing in from the south. On the 27th–31st a third area of low pressure seems to have passed northward at some distance from the coast and was then finally central in Uruguay.

As all these movements take place between latitudes 25° and 45° south (corresponding to our Florida and Maine, respectively) one would perhaps look for the same well-defined types of paths of high and low pressure, but large modifying conditions must be considered, viz, (1) our coast is much farther east of the Rocky Mountain region; (2) the trend of our coast is nearly parallel to the average path of the storm while the trend of the South American coast is nearly perpendicular to that path; (3) our storms at latitude 25° N. are practically over a broad ocean, while at 45° N. they are very largely under the influence of the broadest expanse of the northern part of the North American Continent and of the land regions far to the north, which are hot in summer and cold in winter—whereas on the other hand the South American storms when at latitude 25° S. come under the influence of the heated and broadest portion of the South American Continent, and at latitude 45° S. they are under purely oceanic influences and have naught but ocean between them and the Antarctic Circle. The outcome of this complete inversion of terrestrial conditions is a great change in the meteorology, and the development of a set of paths for the wandering highs and lows that contrast as greatly with those of North America as they do with those of Europe on the one hand and China and Japan on the other. They differ more than one would expect from the paths in the neighborhood of Australia and south Africa. Of course the winds blowing into, out, and around these areas harmonize approximately with the so-called laws of storms, but the movements of areas as a whole seem to be controlled by the surging to and fro of the areas of high pressure whose centers oscillate between latitudes 20° S. and 40° S. on the Pacific side and 20° S. or 30° S. on the Atlantic side.

The month of May, whose charts we have been considering, is the quiet month of the South Temperate Zone just as it is in the North Temperate, the sun has moved northward and the hot weather of February is about to change to the cold weather of June and July; the average temperature at Cape Horn is about 50° F. in February; 35° F. in May and for June, July, and August about 31° F. The rainfall on the west coast is rather more, but the winds are decidedly feebler in May than in February. The well marked areas of high pressure, central at 30° south in February over the Atlantic and Pacific have broken up into broad bands of small areas and will soon become broad bands of very high pressure in June, July, and August, while south of these to latitude 60° south the barometric gradients are very much gentler in May than in February. These gradients and the attendant winds

from the west appear to control the changes and motions in the special temporary areas of low pressure. Indeed the latter appear to owe their very existence to the flow of air over the chain of high mountains and the resulting formation of eddies. Eddies rotating around horizontal axes form cloud and rain on the east, but foehn winds and pamperos on the west of the axis. Eddies around vertical or inclined axes constitute low pressures whose perpetuity and development depend almost wholly upon the question whether the rising air with cloud and rain is on the east side or the west side of the circulation. The general tendency of the low areas is to move southeastward toward the coast of Chile and Argentina and then if they live, to pass northeastward over the east coast.

BRAZIL.

The Department of Marine of the United States of Brazil has for the past nine years published a monthly bulletin giving in full the results of the daily observations at various hours, including Greenwich mean noon observations, taken at a number of stations along the eastern coast, and a few in the interior. In addition to the strictly meteorological features the bulletin gives the results of the magnetic observations made at the central station, Moro de San Antonio, Rio Janeiro. The work for each six months is summarized in semiannual volumes, the periods covered being October–March and April–September respectively. This work is under the immediate supervision of Captain Americo Silvado, of the Brazilian Navy.

The State of São Paulo has had an independent meteorological service since 1886, under the direction of the Commissão Geographica e Geologica de São Paulo, publishing the results of its observations in an annual volume of Dados Climatologicos. General observations are made at the hours of 7, 2, and 9, at about twenty stations, and rainfall observations at several others.

At Juiz de Fora, in the State of Minas Geraes, an independent observatory has been maintained by the municipality since 1893, and has published its observations.

BOLIVIA.

The Sociedad Geografica de La Paz regularly publishes observations made at La Paz. The bulletin of this society has also occasionally contained summaries of observations at other places in Bolivia, among which are Sucre, Oruro, and Trinidad. Private individuals have published observations at Potosi and Cochabamba.

GUIANA.

In British Guiana a fairly complete system of rainfall observations is maintained throughout the colony under the direction of the Government Botanic Garden at Georgetown. In Georgetown itself records of temperature, sunshine, and rainfall are kept up; the record of the latter element extends back to 1880. The observations are published in the Report on Botanic Gardens, Georgetown.

A first-class meteorological observatory is maintained at Cayenne, French Guiana, the data from which are published in the Annales of the Bureau Central Meteorologique de France.

For Dutch Guiana (Colony of Surinam) the Meteorological Jaarboek of the Netherlands has contained, since 1880, daily observations taken at Paramaribo. The French Annales gives an annual summary of monthly means of observations at Burnside-Coronie.

COLOMBIA.

Colombia has a Meteorological Office, but no reports have been received recently. Monthly totals of rainfall, number of rainy days, and greatest fall in 24-hours for Cartagena are published in the Annales of the Bureau Central Meteorologique de France.

ECUADOR.

The Observatorio Astronomico y Meteorologico de Quito seems to be the only meteorological observatory in Ecuador. It publishes an annual résumé of meteorological observations, of which the first volume, for September, 1895, to October, 1896, has been received.

URUGUAY.

In Uruguay the Jesuit Colegio Pio de Villa Colon has maintained a meteorological station of the first order near Montevideo since 1883. The Meteorological Society of Uruguay, established in 1890, maintains a number of second order and rain stations and publishes the results in its Resumen de las Observationes Pluviometricas.

E. D. ARCHIBALD AND THE MODERN KITE.

The Editor regrets that by a slip of the pen in the second column of page 257 of the MONTHLY WEATHER REVIEW for June, "Abercromby" was published instead of "Archibald." The great work done by E. D. Archibald in 1883 in the way of reviving the use of the kite for meteorological purposes was mentioned in the MONTHLY WEATHER REVIEW for 1895 and 1896, but lest modern readers should forget what we owe to him we may add that Archibald carried out a systematic series of observations with anemometers at different heights above the ground during 1883, 1884, and 1885. He used steel music wire as a kite line almost from the start in 1883, and attained heights up to 1500 feet above the ground. He also invented and patented in 1885 the kite balloon to which he gave that name. A combination of the kite and the balloon that we believe was the first ever made.

Mr. A. Lawrence Rotch was present at one of the first flights at Tunbridge Wells, and in 1887 Mr. Archibald took a photograph from a kite, which is also one of the first if not the very first occasion on which that was done. The great improvements that have been made in kite work by Mr. Rotch, the Weather Bureau, and various investigators all over the world have been the natural outcome of Mr. Archibald's demonstration of the general utility of the idea. He may fairly claim to have started the modern systematic kite flying with steel wire for scientific purposes. At the meeting of the British Association for the Advancement of Science in 1884 at Montreal, he brought the importance of the subject prominently to the attention of those present and ventured to predict an important future for this method of studying the atmosphere. His name should replace that of Abercromby on page 257.

THE MOUNT WEATHER OBSERVATORY.

In response to a correspondent inquiring about the Mount Weather Observatory, the Chief of Bureau has lately replied as follows:

The Mount Weather Observatory is not for solar physics alone, nor are the forecasts of the U. S. Weather Bureau likely to be founded upon solar observations only, but upon the data and study of the atmosphere itself.

The Weather Bureau makes forecasts of weather and of floods that are of general and sometimes of critical importance to agriculture, commerce, and many other human interests. These forecasts depend upon our knowledge of a branch of science whose field is the study of the earth's atmosphere as a whole.

Recent research has shown that there is a possibility of improving these forecasts by a more complete study of the changes going on in the radiation that we receive from the sun, but this is a minor matter compared with the study of the so-called waves of temperature, pressure, and moisture that pass over the earth's surface, and the mechanical laws that govern the movements of the air. As progress in our knowledge of the mechanics of the earth's atmosphere can only be made by means of daily weather charts, laboratory experiments, and mathematical study, therefore the U. S. Weather Bureau has established a meteorological institution of broad scope, designated as the Mount Weather Ob-

servatory, at which every branch of investigation and study bearing on the atmosphere will be pursued, especially (1) observations of the upper strata of the air by means of kites and balloons, (2) observations of the clouds by the nephoscope, (3) experiments in the physical laboratory on the motions of small masses of air under conditions that are precisely known, (4) observations of the total radiation from the sun by means of actinometers and bolometers, (5) details of the solar condition recorded by apparatus at the solar physical observatory, (6) records of the electrical and magnetic phenomena of the earth and atmosphere, and (7) particularly the education of special students in the interpretation of all these observations by means of the higher mathematics, so that the results of the knowledge thus gained may advance meteorology and improve the weather forecasts.

This recognizes that behind every practical art of doing there must be a higher science of studying and knowing.

IMPORTANCE OF RESEARCH OBSERVATORIES FOR THE PROMOTION OF METEOROLOGY.

The public is familiar with the idea that it is a fine thing to establish great hospitals, universities, libraries, churches, technical schools, and other institutions that minister to the practical needs of mankind, but very few have as yet awakened to realize the fundamental importance of institutions for the increase of knowledge, as distinguished from those that merely diffuse knowledge or from many others that apply knowledge to ameliorate the condition of mankind. We often think of our public institutions as marking the great difference between the present and the past ages, but the ancients had their asylums and hospitals, their irrigation systems, their machinery, aqueducts, sewers, and other ways of applying whatever knowledge they had.

The fundamental difference between the present age and all previous time is not the school nor the asylum, but the enormous increase in our actual knowledge of nature in all her minutest and most complex workings. We must increase knowledge before we can teach it or apply it and to bring about this increase is the peculiar province of those men who devote themselves to research so-called. A few names distinguished for research come down to us from antiquity, such as Archimedes, Eratosthenes, Pliny, Aristotle. Doubtless there were others whose names have been forgotten, but in modern times the number has been immensely increased since the days of Copernicus, Galileo, Newton, Huyghens, and Descartes.

Science is sometimes said to be a systematic arrangement of our knowledge of nature as distinguished from the vague and erroneous traditions and guesses of less fortunate times; but modern science is more than an arrangement of knowledge—it is research for the purpose of increasing knowledge. No one can hold a high place in science unless it can be shown that he has on many occasions been able to elucidate with precision that which was previously imperfectly known or perhaps unsuspected. The best scientific men, or "researchers" as they have lately been called, are distinguished by an inborn and cultivated ability to concentrate their whole energies upon a solution of a definite problem until the work is done. Generally speaking they do not care so much for salaries or positions or the practical application of their knowledge, as they do for the opportunity of devoting their lives to the research work that they love. Such valuable men have to be provided for and for several centuries scientific societies and the better endowed universities as well as wealthy men have set aside small sums of money establishing fellowships or something equivalent for the support of those who have shown ability in research. In fact the German universities have for 90 years been animated more by the spirit of research than of instruction, and promotions therein have been based almost wholly on ability in original research.

There have been several notable illustrations of munificent foundations for the special benefit of research. Such was the Royal Institution of London organized about 1800 by that most brilliant American, Benjamin Thompson, Count Rumford. It has supported such eminent men as Sir Humphrey Davy, Michael Faraday, John Tyndall, and Lord Rayleigh.

Doubtless it was this successful foundation that led James Smithson to establish his great fund "for the increase and diffusion of knowledge" in which sentence he in fact quoted from Washington's farewell address. Possibly Smithson thought that in a free and peaceful republic scientific men would be less trammeled than in an aristocratic and warlike nation. He himself loved knowledge for its own sake but doubtless realized that to some "knowledge is wealth" to others "knowledge is power." Hitherto Americans like Peabody and Rockefeller have distinguished themselves by the endowment of education; Carnegie has given a great fund for research; Lick, Yerkes, McCormick, and others have given large sums for special research in astronomy, but we know of no one who has endowed research in meteorology. It has therefore become unavoidable that the Weather Bureau should solicit from the Federal Congress of the United States the funds needed for research in that difficult branch of science whose development is essential to the improvement of practical meteorology.

We quote the following appreciative remarks from an article by Dr. Frank Waldo, in the Boston Evening Transcript of August 19, 1905:

Is there an honest and economical reason for this establishment? Being conversant with Weather Bureau conditions I am able to answer in the affirmative. It has been a long cherished desire on the part of all Government meteorologists to undertake the class of careful studies of the atmospheric conditions that have been pursued by some European governments. But a lack of proper facilities has, in a great measure, prevented such undertakings, their practical importance not being recognized by the "appropriating" powers who have been more interested in the matter of extending weather predictions to a wider circle of recipients, than in the slow increase of accuracy which might be expected to result from expensive studies and costly equipments. This feeling of economy went so far some years ago that the official publication of professional papers by the Weather Bureau was ordered discontinued. * * *

While great advances have been made in theoretical meteorology yet what has been most needed has been more accurate and more numerous observations of atmospheric conditions, not only over the world at large, but also in special locations. This last has necessitated the establishment of proper observatories.

Three kinds of special observatories have been erected in the prosecution of meteorological studies. First, a central observatory, which acts as a bureau institution for the ordinary observing stations such as are scattered over the country—whence the former may control the work of others and set them an example of the highest class of work in their line of observation. Such an observatory has been maintained at Washington from the beginning of our Weather Bureau, although its efficiency has greatly increased within recent years since the Bureau has had a building of its own. These observatories were mostly established in the capital cities.

But as the work of observational meteorology increased in accuracy, observatories were instituted at some distance from the disturbing influence of the towns. To this class belong the famous observatories of Kew, at Richmond, England, Pavlovsk in Russia, and Potsdam near Berlin. We had indeed one somewhat similar observatory in this country, Central Park, New York; but it was conducted on a meager scale and in its work did not attain the refinement of the great observatories of Europe. But we had no national observatory of that class.

As long ago as 1883 * * * the present writer was directed by Gen. W. B. Hazen, then the head of the Signal Service, to draw up plans for a small observatory of this class to be established at Fort Myer, Va., which was then the training school for the Signal Service men and was under control of that Service. By utilizing the temporary buildings already constructed at Fort Myer, only a few thousand dollars were needed for the proper housing and setting up the meteorological instruments. But even that petty sum was not forthcoming, chiefly owing to the objections in Congress.

Fort Myer has passed out of control of the Weather Bureau, and now twenty years after General Hazen's unsuccessful attempt Professor Moore has established such an observatory as the Weather Bureau has so long needed, only to be attacked by sensation mongers. What will these critics say when they are told that the best interests of practical meteorology require at least 25 such observatories located at different parts of the United States? The day will come when we shall have them. * * *

It is one of the anomalies of our educational system that weather

science which plays such an important part in our daily lives should be so little taught that in all our hundreds of colleges there is only one that has a chair of climatology. We are an agricultural nation and the variations in the weather are the chief cause of variations in crops—and yet the farmers' children are taught almost nothing about the science of weather and climate and their relations to agriculture. * * *

The exquisitely appointed Russian observatory at Pavlovsk is located in a corner of a park belonging to the royal family. There the late Professor Wild was accustomed to spend his summers and while he no doubt enjoyed its beauties, yet he carried on experiments and observations which made this observatory the most celebrated of its kind in the world. The present writer will never forget the summer weeks that he spent in that fairyland of science.

Or take another case, that of the Potsdam Observatory. The German Government is not given to wasting money and yet it supports a most extensive observatory in the beautiful Potsdam Park; an observatory which performs in part the same functions as will the new Weather Bureau observatory.

A third kind of observatory has also been established in Europe, viz, well equipped observatories at high elevations on mountain peaks. Such are the observatories of Ben Nevis, Scotland, Puy de Dome and Pic du Midi in France, and the Sonnblick in the Tyrol. We had it is true our own Mount Washington and Pikes Peak government observatories, but they were only counterparts of the ordinary Signal Service observing stations and had none of the completeness of the best European mountain observatories. It remained for Mr. A. Lawrence Rotch, of Boston, to give us the first well-equipped mountain observatory in this country, and although he located it on the relatively low-lying crest of the great Blue Hill, yet it is perfect in its appointments, and sets us an example by which to build our future mountain observatories. The work of this private observatory is among the best of its kind in the world.

However pleasant a few days sojourn on a mountain top may be in midsummer, no one will say that it remains agreeable for any lengthy stay, and a winter's residence is only made bearable by a sense of obligation or duty. Some of the most heroic scientific work ever undertaken has been at these mountain meteorological stations, as the records of Ben Nevis, the Sonnblick, and Mount Washington amply show. And the new Mount Weather Observatory will undoubtedly furnish an additional field for heroic winter scientific research, although the climate is not so severe as on some higher mountains on which observatories have been located.

That observatory is in a manner a combination of these two kinds of observatories, in both of which our Government service has hitherto been lacking; it fills the place of two observatories by accomplishing the work of both. It has then been an economy to build this combination observatory. * * *

At the present time the Weather Bureau has no adequate training school for its observers, and its new observatory will fill this need to the extent of its limited capacity. * * *

There are many college instructors and other scientific men who desire to carry on some special work, bearing on meteorology, at a well equipped observatory. Such men are made welcome at the great European observatories, and they have carried on valuable observations and experiments. The Weather Bureau is now for the first time able to extend such courtesies to American and foreign scientists. * * *

There is a great class of refined observations which can only be carried on at a distance from the disturbing influence of a city. Such observations can now be undertaken at this new observatory. In the study of the phenomena connected with American storms it has an unsurpassed location. It lies as nearly as possible within the track of the three great classes of storms that sweep over the eastern United States; the cyclones from the Mississippi Valley, those from the west Gulf (Texas and Mexico), and those from the West Indies which pass along our eastern coast. We may now expect that much light will be thrown upon the relations of these storms. * * *

In fine, the building of this new weather observatory must be regarded as the most important step taken by our Government in late years for the betterment of the Weather Bureau service.

MOUNTAIN STATIONS AND THEIR IMPORTANCE.

A letter of March 23, 1905, from Prof. Alexander G. McAdie incloses one from Prof. J. E. Church, jr., of the Nevada State University, Reno, Nev., relative to observations on Mount Whitney, Cal., and Mount Rose, Nev., with the request that the Editor give his opinion as to the importance of mountain stations.

The letter of Professor Church reads as follows:

RENO, NEV., *March 18, 1905.*

Prof. ALEXANDER MCADIE,
San Francisco, Cal.

DEAR SIR: Mr. Marsh and I spent eight days on Mount Whitney and climbed to the altitude of 13,250 feet where we could look down on Langley's Lake. At this point the ledge was piled full of drifting snow with a treacherous crust beneath, I now believe that we could have succeeded in crossing this, although the risk would have been great.

The ascent to 13,500 could be made at any season of the year, I believe, especially if two or three cabins were constructed along the trail for refuge in case of storm. Access could be had to the summit also during most of the year, Mr. Marsh believes, if a narrow trail for man were cut higher up the pinnacles where the drift snow could not lodge in sufficient quantity to prevent the observer from keeping the trail open. The expense would not exceed $150.

The weather was mild, though snow clouds hung over the mountains. The temperature did not fall below 10° F. The wind blew almost constantly from the east, from the subtropical Owen's Valley, and seemed to have an appreciable affect upon the temperature of the mountain, for Lone Pine Lake (9800 feet) and Mirror Lake at timber line (10,450 feet) were only partially frozen over, while the lakes west of Mount Whitney at apparently similar altitudes were frozen completely over and covered with snow. The snow also was mealy and unstable, with little hardness anywhere, such as I have always found on Mount Rose above the altitude of 8500 feet.

As regards the difficulty of the ascent in winter, I should consider Mount Shasta as not only far easier, but also entirely safe save for the possible fusillade of rocks below the Red Cliffs. There is no horse trail up Mount Shasta, however, above the altitude of 9000 feet.

I wish I were free to volunteer to take observations on Mount Whitney for you for a year.

If you are willing, I will take the readings of a maximum and minimum thermometer on Mount Rose (10,860 feet) north of Lake Tahoe, nearly every month during the coming twelve months, if you will send me the instruments. The results might have some value. Mount Rose is the highest point east of the summits of the Sierras and north of Lake Tahoe. The wind is usually very high there, but Lake Tahoe may have an influence on the temperature. If you are favorable, I could place the thermometers on Mount Rose at once. The temperature early in February at 6500 feet altitude on this mountain fell considerably below zero to judge from the frost crystals in my sleeping bag and frosted feet, and from the temperature of —15° and —25° F. at Truckee and Floriston the same night.

Our party had the honor of naming the peak directly south of Lone Pine Pass, Mount McAdie, to commemorate your services in advancing the science of climatology. Its altitude is at least 13,500 feet. If, as Mr. Marsh declares, this peak has not previously been named, we beg that you allow this name to stand.

The importance of mountain stations has been felt to an increasing degree ever since Perrier, by the advice of Pascal and Descartes, ascended the Puy de Dome, and demonstrated beyond all cavil that barometric pressure diminishes with altitude in proportion to the weight of the atmosphere left below as the observer ascends. It thus became evident that the vacuous space in the upper part of the barometer tube was not due to the fact that nature abhors a vacuum, but to the actual pressure exerted upon the mercury in the cistern by the surrounding gas. The so-called barometric constant now used in hypsometry was approximately determined about 1800–1810 by a series of observations made by Ramond at the summit of the Pic du Midi de Bigorre, France, and by Dangos at Tarbes near the base of that mountain. But permanent mountain stations began at a much later period, and for a long time the most famous of these were our own stations on Mount Washington and Pikes Peak. As the Editor had something to do with the establishment and maintenance of these stations, he may be allowed to say that their records still rank among the most important that we have. They gave us, day by day, positive knowledge in place of hypotheses as to what was going on in the atmosphere far above the conditions depicted on our daily weather maps. It was not necessary to reduce such stations to sea level, for we wanted the records as they were for these upper levels. If we could only have had enough stations to make maps of the conditions above us, we should undoubtedly have advanced far ahead of where we are now in our knowledge of the atmosphere and in our ability to predict the weather. In future years numerous kite and balloon stations will undoubtedly enable us to realize this great desideratum.

Now that very high mountain stations exist all over the world, we may turn to them and the studies that have been made of their records, especially as quoted in Hann's Lehrbuch

der Meteorologie. Among the high stations Mexico has eight that really belong to high plateau stations, United States had three high plateau stations and two mountain stations, South America has two high plateau stations and three very high mountain stations. In Austria-Hungary we find three high mountain stations, in Great Britain one, in France four, in Germany four, Russia one, Portugal one, Switzerland five. India has two plateau and one mountain station. South Africa has three mountain stations; Australia, New Zealand, and Madagascar have each one.

Most of these are simple observing stations, eight or ten of them are furnished with continuous self-recording apparatus, and a few of them are so elaborately equipped as to be more properly designated observatories of the first class. At most of these stations the diurnal periodicities of the temperature, wind, and cloudiness have been carefully determined, and the comparison with the same periodicities at lower stations has revealed differences that seem to follow regular laws, which, if they continue to hold good for still higher regions and for other portions of the globe, may make us feel that we begin to know something about the ocean of air above us. But have we a right to infer that what holds good for a mile above sea level will also obtain for twenty or fifty miles farther up? That is the problem that is now being solved by the use of kites and balloons. The sounding balloon gives us six items with regard to the atmosphere up to ten or twelve miles, namely, the temperature, moisture, insolation, radiation, direction, and velocity of movement of the air. It could tell us about the pressure at those altitudes if we had any method of measuring the altitude trigonometrically, but thus far this has rarely been possible and the self-recording barometer carried by the sounding balloon is only used as a basis for determining the altitudes. The items given by the sounding balloon are very meager because they only hold good for a few hours on special days, but they are exceedingly welcome as supplementary to the continuous records of mountain stations.

Although thousands of observers have been at work for a hundred years gathering meteorological data yet much of this work has had an amateurish character and only a small portion of it lends itself to the needs of modern investigation. We have now a fairly satisfactory series of maps giving monthly and annual averages of pressure, temperature, winds, and rainfall for the surface of the land and the ocean, but we know less about the upper air than we do about the ocean deeps. So far as we can now see, our knowledge of the conditions and motions of the atmosphere in the midst of the clouds a few miles above our heads (where our storms form, develop, and die) must always depend upon the results of difficult mathematical investigations, checked as to their accuracy by an occasional balloon ascension and the steady records of a few mountain observatories. The conviction of the truth of this general statement has led the leading meteorologists of the world to unite in international work for the maintenance of mountain stations, kite work, balloon work, and for the publication of a series of memoirs embodying the results of their study "on the physics of the free atmosphere or the scientific investigation of the higher strata of air." The last number of the publications of the International Committee for Scientific Aeronautics gives the results of simultaneous observations on April 14, 1904, as obtained by seven sounding balloons, five ordinary balloons, five kite stations, twenty-five mountain or hill stations, and thirty-three stations for the observation of clouds. All of these relate to the atmosphere over Europe, excepting the one record from Blue Hill, Mass. There could not be any more eloquent testimony as to the value of research in the upper air and the thoughtful reader will at once see that up to the present time mountain observatories have formed the fundamental basis for all this work, while kites and balloons have been but auxiliaries. These latter are sent up simultaneously once a month, while the mountain work goes on continuously night and day. All this is research work so-called, looking to the improvement of our knowledge of the atmosphere and therefore of our weather predictions, which latter may for a long time depend wholly upon weather maps representing the conditions near sea level. We must wish success to every movement toward the establishment of mountain stations in the United States. They are doubtless expensive and life therein may be lonesome, but enthusiastic observers and students will always be found to do work worthy of the support of the patrons of science. The mountain peaks of the Coast Range, the Sierras, Rockies, and Appalachians should be crowned with a series of sentinel towers where watch may be kept of every change foreboding storm, or rain, or drought. The astronomers have their hundreds of costly observatories for the study of the sun and the stars, but it is still more important that meteorologists should be furnished with the observatories that are so greatly needed by them.

AN ABSURD EXPLANATION AS TO INDIAN SUMMER.

A writer who signs himself L. M. McC. published in the Chicago Evening Post of October 4, the following paragraph:

> At Indian summer the whirling planet sails into the broad aerial gulf stream, a vapor plane that stretches through space. Its dust fills the atmosphere, its moisture and peculiar qualities for light reflection bring us the hazy days, the mellow sunlight, and that mysterious influence of indolence.

Those who have studied astronomy and physics in the ordinary high school scarcely need to be told that these ideas are purely fanciful and entirely contrary to what is possible in nature. We have not yet been able to prove that meteors or shooting stars or meteoric dusts have anything more than a perfectly inappreciable influence on our atmosphere; they must have some little influence, but they do not produce the Indian summer haze. There is no broad aerial gulf stream for our whirling planet to sail into. There is no vapor plane stretching through space. The dust and moisture that fill our atmosphere rise up from the surface of the earth and produce the haze that we see until clouds and rain wash the air clean again.

THE ALTITUDE OF MOUNT WHITNEY, CAL.

Communicated by H. C. Rizer, Acting Director, U. S. Geological Survey, September 1, 1905.

The elevation of Mount Whitney, Cal., was determined by the U. S. Geological Survey as being 14,502 feet in August, 1905, by a check line of spirit levels run by Mr. R. A. Farmer, topographer, under the direction of Mr. E. M. Douglass, geographer, from Mount Whitney station on the Southern Pacific Railroad, situated a few miles north of Owens Lake, to the summit of the peak. The initial elevation of Mount Whitney station was accepted as 3691 feet, as derived from a line of precise levels run earlier in the season from Mojave, Cal. The bench mark at Mojave, in turn, is on a line of precise levels based upon a tidal bench mark at San Pedro Harbor near Los Angeles, and checked by connecting with a tidal bench mark of the Coast and Geodetic Survey at Benicia Arsenal on San Pablo Bay, a few miles north of San Francisco. The distance from Mount Whitney station to the summit of Mount Whitney along the line leveled is 23 miles, with a rise of 10,811 feet.

Other determinations of Mount Whitney make its elevation as follows:[1]

Authority.	Method.	Feet.
Professor Whitney,	by barometer	14,898
Lieutenant Wheeler,	by barometer and vertical angles	14,470
Professor Hallock, of Columbia University, New York,	by boiling point	14,525
Professor Langley,	by barometer	14,522

[1] A discussion of the previous determinations of the altitude of Mount Whitney will be found in the MONTHLY WEATHER REVIEW for November, 1903, pages 524, 527, 533. Professor McAdie's computation of his own observations gave 14,515 feet.—ED.

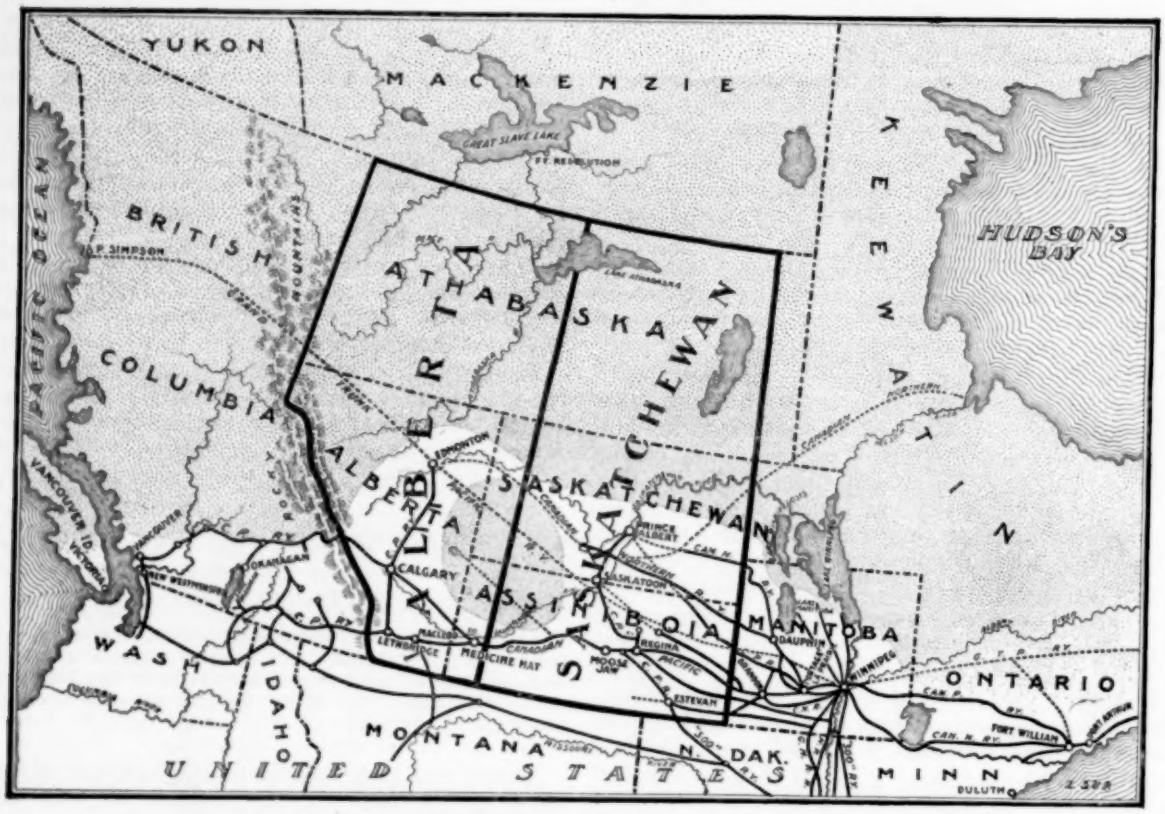

FIG. 1.—Map of the new Canadian Provinces. (By permission of Doubleday, Page & Co.)

NEW CANADIAN PROVINCES.

The Editor has obtained from Doubleday, Page & Co., publishers of The World's Work, permission to reprint the chart that appeared on page 6612 of the September number of that journal showing the recent changes in the boundaries of the Canadian Provinces. The heavy black lines show the boundaries of the two new provinces in western Canada which came into legal existence on the first of September. Alberta as a province comprises the former territorial district of Alberta, a small portion of the districts of Assiniboia and Saskatchewan and the western half of Athabaska. The new province of Saskatchewan comprises the greater portion of the old territories of Saskatchewan and Assiniboia, and the eastern half of the former territorial district of Athabaska. The boundaries of Manitoba, Ontario, British Columbia, Yukon, Mackenzie, and Keewatin do not appear to have been changed to any extent. The route of the proposed Canadian Northern Railway is shown on this map, fig. 1.

The new provinces Alberta and Saskatchewan, extending from 49° north latitude on the south to 60° on the north, embrace about 145 square degrees, and are generally now spoken of together as western Canada. During the past ten years they have been settled by over 500,000 immigrants, a large portion of whom come from the United States.

The land is a prairie soil especially adapted to the growth of wheat and to grazing on a large scale.

Regina is at present the capital of the new Saskatchewan, but other towns are competing for that privilege. Edmonton is at present the capital of the new Alberta, having wrested that honor from Calgary.

With regard to the meteorology of this region, Mr. B. C. Webber, Assistant Director of the Meteorological Service of Canada, writes that no new stations will be established in the immediate present, but such may be expected from time to time in the near future.

Of the stations whose data are published regularly in Table 5 of our MONTHLY WEATHER REVIEW Battleford, Prince Albert, Qu'Appelle, Swift Current, now belong to Saskatchewan. Banff, Calgary, Edmonton, and Medicine Hat now belong to Alberta.

THE GREEN RAY AT SUNSET.

The observation of the green ray seen just as the last glimpse of the sun disappears below the sea horizon was originally introduced into meteorology by Tyndall as an evidence of the special absorptive power of the aqueous vapor in the lowest layer of the atmosphere. A short memoir on this subject was lately published by W. H. Julius in the Archives of the Academy of Sciences of the Netherlands, and in reviewing this work in the Physikalische Zeitschrift, 1905, page 24, Dr. H. Schering says:

> After a short résumé of the phenomena as described by others, according to whom the so-called green ray appears as a greenish-blue column of light or flame that is seen on very clear days at the moment of the appearance at sunrise or disappearance at sunset of the upper edge of the sun behind the horizon, Julius describes his own observations near Sicily and Suez, in the Red Sea and the Indian Ocean. According to him, at sunset the yellowish orange segment assumes gradually a greenish tint, while the sun's limb is sharply defined and without any other color. The green also extends beyond the neighborhood of the orange segment, especially is it visible at the two ends of the segment at the instant when, by the junction of these ends and the disappearance of the sun, it assumes the form of a small flame. The duration of the phenomenon varies somewhat, but may be estimated at two seconds.
>
> Sohnke, Schülke, Ekama, and others explain the green ray as a consequence of the dispersion due to refraction. But the execution of a short computation gives for the breadth of such a green blue border produced by dispersion at the sun's limb, when it is in the horizon ten seconds of arc, and when it is ten degrees above the horizon, 1.6 seconds. That is to say, the phenomenon should not last more than two-thirds of a second of time at sunset behind the natural horizon in the Tropics, and only one-tenth of a second of time when the sun disappears behind a mountain at ten degrees above the horizon. Since this older explana-

tion does not agree with the author's observations, Julius proposes another, namely, that the phenomenon is produced by anomalous dispersion and that in fact the free ions, which according to Ebert and Lenard are most numerous in the upper strata of air, are in general the cause of the terrestrial absorption. In this way the rarity of the phenomenon, its dependence on meteorological conditions, and its slow diminution of duration with the altitude above the horizon may be accounted for. But H. Schering remarks that independent of the fact that, according to the latest measurements in free balloons made by Luedeling as well as by Gerdien, an increase of ions at the greatest altitudes is not probable, there exists such a great difference in the magnitude of the number of ions and the number of molecules in a cubic centimeter that we ought not to expect such a spectral effect as Julius assumes even if the ionization were many thousand times greater than is ordinarily found. In fact, the average number of ions in a cubic centimeter is only 1×10^3, whereas the number of molecules is 2×10^{19}.

BALL LIGHTNING.

A letter from Mrs. A. E. Russell, of Paducah, Ky., reports the following phenomenon which seems to be as genuine a case of ball lightning as any that has hitherto been described:

My niece and I were sitting in my front hall on July 16, 1905, when suddenly, without warning, what seemed like a big ball of fire passed between our heads. My niece's head was not distant more than six inches from our telephone box. She experienced no shock, while I was blinded by it for half a minute.

The front and back hall doors were screened[1] but they showed no sign of any lightning having touched them. A tree in the back yard about ten yards from the back hall door had a round hole made in the bark with a dent in the wood just as if a cannon ball had been shot against it. The three horses standing near the tree were knocked down; the horse standing in a straight line between the tree and the house seemed dead for a long while.

My niece says that there had been a low rumbling noise of thunder just previous to the lightning, but I did not hear it. A neighbor who had left my house two minutes before and was on the road says she heard no thunder and saw no lightning until suddenly a terrific explosion seemed to occur just over her head; she was blinded and saw nothing more.

I have witnessed the lightning strike trees three times on our front lawn, but I never before saw a ball of fire.

CORRIGENDA.

MONTHLY WEATHER REVIEW for 1904, Vol. XXXII, No. 13, Annual Summary, page 605, first column, line 41, for "levelings" read "altitude"; line 42, for "Prof. Joseph N. Le Conte" read "the director of the U. S. Geological Survey." For August, 1905, page 350, column 2, "Rivers and Floods," line 7, for "northern" read "southern."

THE WEATHER OF THE MONTH.

By Mr. WM. B. STOCKMAN, Chief, Division of Meteorological Records.

PRESSURE.

The distribution of mean atmospheric pressure is graphically shown on Chart VIII and the average values and departures from normal are shown in Tables I and V.

The mean barometric pressure for the month was highest over New England, the Middle Atlantic States, northern portion of the South Atlantic States, Ohio Valley and Tennessee, and lower Lake region, with the crest over northeastern West Virginia carrying a value of 30.11 inches. The mean pressure was lowest over southeastern California and southwestern Arizona, the minimum, 29.76 inches, occurring at Yuma.

The mean pressure for the month was .01 to .03 inch above the normal in Virginia, eastern West Virginia, and northwestern California; elsewhere it was below the normal, but with slight departures, except over northeastern California, west-central Nevada, Washington, northern Idaho, and northwestern Montana, where they ranged from —.05 to —.08 inch.

The mean pressure diminished from that of August, 1905, in southern Florida, western New Mexico, Arizona, Utah, Colorado, Wyoming, western South Dakota, Montana, except the northeastern portion, Washington, except the southeastern portion, western Oregon, and California, except the extreme northeastern portion; elsewhere the mean pressure increased. The decrease was greatest over western Washington, where it ranged from —.05 to —.12 inch; and the increase was most marked over the Atlantic States as far south as central North Carolina, lower Lake region, southern portion of the upper Lake region, central Mississippi and lower Missouri valleys, and the Ohio Valley and Tennessee, where it ranged from +.05 to +.09 inch.

TEMPERATURE OF THE AIR.

The mean temperature for the month was below the normal in New England, except southwestern Connecticut, northeastern and east-central New York, northeastern and southwestern Pennsylvania, northwestern West Virginia, western Arizona, California, except the east-central and northwestern portions, northwestern Nevada, extreme northwestern Oregon, and on the immediate coast of Washington; elsewhere it was above the normal. The negative departures were less than 1.0°, except in one instance in central California, while the positive departures generally were greater than 2.0°, and more than 4.0° in southwestern Kansas, east-central Nebraska, southeastern Wisconsin, north-central upper Michigan, western Minnesota, and North Dakota, and from +5.0° to +5.3° in eastern Montana.

The average temperatures for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	8	56.9	— 0.9	—12.2	—1.4
Middle Atlantic	12	67.1	+ 0.8	— 6.6	—0.7
South Atlantic	10	75.6	+ 2.4	— 2.8	—0.3
Florida Peninsula*	8	80.7	+ 1.5	+ 3.8	+0.4
East Gulf	9	77.8	+ 2.5	— 5.6	—0.6
West Gulf	7	78.6	+ 2.6	— 5.2	—0.6
Ohio Valley and Tennessee	11	69.6	+ 1.4	— 7.8	—0.9
Lower Lake	8	64.4	+ 1.3	— 9.7	—1.1
Upper Lake	10	62.2	+ 3.0	— 3.9	—0.4
North Dakota*	8	59.8	+ 2.6	+ 3.9	+0.4
Upper Mississippi Valley	11	67.0	+ 2.3	— 6.4	—0.7
Missouri Valley	11	67.7	+ 2.5	— 4.0	—0.4
Northern Slope	7	61.4	+ 3.3	+ 1.9	+0.2
Middle Slope	6	70.4	+ 2.7	— 4.4	—0.5
Southern Slope*	6	74.5	+ 2.5	— 9.6	—1.1
Southern Plateau*	13	69.7	+ 0.2	— 4.1	—0.5
Middle Plateau*	8	61.4	+ 0.5	+ 5.1	+0.6
Northern Plateau*	12	60.6	+ 2.8	+14.0	+1.6
North Pacific	7	58.2	+ 1.1	+10.4	+1.2
Middle Pacific	5	64.9	+ 0.4	+ 7.7	+0.9
South Pacific	4	67.8	— 0.5	+ 5.8	+0.6

* Regular Weather Bureau and selected cooperative stations.

Maximum temperatures of 80°, or higher, were reported from all sections, except the coast of Maine, the islands off Massachusetts and Rhode Island, the northern portions of New Hampshire and Vermont, the mountain regions of Colorado, and the northwestern portion of Washington; 90°, or higher, in the South Atlantic and Gulf States, Tennessee, except the mountain districts, lower Ohio Valley, southern portions of the upper Mississippi and Missouri valleys, and generally over the slope and Pacific regions, except along

[1] Light fly-screen doors for the summer season.—[Ed.]

the coast and portions of the Plateau region; and of 100°, or higher, from portions of southwestern Mississippi, eastern Louisiana, lower Rio Grande Valley, north-central Texas, western Oklahoma, south-central Kansas, southeastern New Mexico, western Arizona, and central and southeastern California, and of 110° to 118° in extreme southeastern California and western Arizona, except at Yuma.

Freezing temperatures occurred in sections of the northern tier of States, in the mountain regions of Pennsylvania and in the Rocky, Cascade, and Sierra Nevada mountain regions. Minimum temperatures of less than 20° were reported from Idaho and Colorado, and of one degree below zero from the station at Boca in the mountains of east-central California. Minimum temperatures somewhat higher than 60° occurred in the southern portions of the South Atlantic and Gulf States and of 70° to 73° in southern Florida.

By geographic districts the temperature was above the normal in all sections, except in New England and the south Pacific.

In Canada.—Prof. R. F. Stupart says:

The temperature was below the average in Quebec and over the greater portions of the Maritime Provinces and British Columbia; elsewhere in the Dominion it was above the average. The chief positive departures occurred in Manitoba and over the southern parts of Alberta and Saskatchewan and ranged from 3° to 5°, and the most marked negative departures were experienced in the vicinity of the Bay of Fundy and along the south shores of Nova Scotia where in many localities the deficiency was 3° and over.

PRECIPITATION.

Excesses of precipitation ranging from 3.0 to 8.0 inches occurred in eastern Kansas, northern and central Missouri, extreme western Iowa, eastern Nebraska, extreme western Florida, and southeastern Louisiana, and of 2.0 to 3.6 inches on the coast of Maine, in southeastern Vermont, eastern Massachusetts, southeastern New York, north-central Tennessee, northern Arizona, and northwestern Washington. Deficiencies of 2.0 to 4.4 inches occurred in extreme southern Wisconsin, northeastern Iowa, northwestern Louisiana, the extreme eastern portions of Texas and Tennessee, northeastern Alabama, northwestern and eastern Georgia, northeastern Florida, and the eastern portions of the Carolinas.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	8	4.91	158	+1.8	−2.5
Middle Atlantic	12	3.20	86	−0.5	−0.6
South Atlantic	10	2.51	48	−2.7	−5.8
Florida Peninsula*	8	8.52	109	+0.7	+5.2
East Gulf	9	4.55	121	+0.8	+0.9
West Gulf	7	2.06	51	−2.0	+2.2
Ohio Valley and Tennessee	11	2.56	86	−0.4	−3.0
Lower Lake	8	2.23	76	−0.7	−1.1
Upper Lake	10	3.18	91	−0.3	+1.0
North Dakota*	8	1.26	131	+0.3	+2.1
Upper Mississippi Valley	11	3.32	103	+0.1	−1.0
Missouri Valley	11	5.63	232	+3.2	+5.2
Northern Slope	7	0.88	90	−0.1	+2.6
Middle Slope	6	2.47	139	+0.7	+4.7
Southern Slope*	6	3.01	120	+0.5	+6.9
Southern Plateau*	13	1.65	194	+0.8	+5.8
Middle Plateau*	8	1.93	233	+1.1	+1.8
Northern Plateau*	12	1.15	100	0.0	−1.4
North Pacific	7	4.11	142	+1.2	−6.6
Middle Pacific	3	0.11	15	−0.6	−3.2
South Pacific	4	0.12	100	0.0	+3.1

*Regular Weather Bureau and selected cooperative stations.

By geographic districts the precipitation was normal in the northern Plateau and south Pacific districts; below normal in the Middle, South Atlantic, and west Gulf States, Ohio Valley and Tennessee, Lake region, and the northern slope and middle Pacific districts; elsewhere it was above the normal.

The distribution of total monthly precipitation is shown on Chart III.

In Canada.—Professor Stupart says:

The rainfall was above the average in British Columbia, except far north in the interior, the positive departures being very marked in many localities, especially in the lower mainland where New Westminster recorded 7.10 inches above the usual amount. In Alberta, except at Edmonton, where it was two-tenths of an inch above the average amount, the rainfall was generally deficient, Calgary reporting as much as an inch below the usual quantity. In Saskatchewan and Manitoba the precipitation was above the average in some localities and below in others, a positive departure of 3.10 inches at Qu'Appelle and a negative one of 0.90 inch at Medicine Hat were the most noteworthy departures. In Ontario from the Lake Superior district east almost to the boundary and including the Georgian Bay region the rainfall was usually well above the average, otherwise it was nearly everywhere deficient, especially over Lakes Erie and Ontario and their environs. Port Stanley recorded 1.70 inches below, Toronto, 1.0 inch below, Kingston, 0.90 inch below. In Quebec the average amount was exceeded in all localities, also in the Maritime Provinces, except at Halifax and its immediate vicinity, where a deficiency of over an inch was reported. The principal positive departures were Quebec, 1.0 inch; Father Point, 1.50 inches; Chatham, 2.60 inches; St. John, 2.10 inches; Fredericton, 1.90 inches; Charlottetown, 1.40 inches.

HUMIDITY.

The relative humidity was normal in New England, the South Atlantic States, and the south Pacific region; below normal in the Middle Atlantic States, Florida Peninsula, and the northern Plateau and middle Pacific regions; elsewhere it was above normal.

The averages by districts appear in the following table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	81	0	Missouri Valley	72	+ 6
Middle Atlantic	78	− 1	Northern Slope	56	+ 1
South Atlantic	80	0	Middle Slope	64	+ 6
Florida Peninsula	81	− 1	Southern Slope	65	+ 2
East Gulf	78	+ 2	Southern Plateau	50	+11
West Gulf	77	+ 3	Middle Plateau	43	+ 5
Ohio Valley and Tennessee	75	+ 3	Northern Plateau	46	− 6
Lower Lake	76	+ 3	North Pacific	81	+ 3
Upper Lake	80	+ 3	Middle Pacific	63	− 4
North Dakota	70	+ 4	South Pacific	66	0
Upper Mississippi Valley	79	+ 7			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Hannibal, Mo	14	50	s.	North Head, Wash	25	77	se.
Mount Tamalpais, Cal	16	55	nw.	Omaha, Nebr	15	54	ne.
Do	17	51	nw.	Sioux City, Iowa	15	50	se.
Do	24	53	nw.	Tatoosh Island, Wash	1	53	e.
Do	26	54	nw.	Do	19	60	s.
Do	27	61	nw.	Do	24	51	sw.
Do	28	58	nw.	Do	25	50	s.
Do	29	62	nw.				

CLEAR SKY AND CLOUDINESS.

In the south Pacific and lower Lake regions there was an average of cloudiness; less than the average in the middle Pacific and upper Lake regions, Ohio Valley and Tennessee, and the west Gulf and south and middle Atlantic States. In the remaining districts there was more than the average cloudiness.

The distribution of clear sky is graphically shown on Chart IV, and the numerical values of average daylight cloudiness, both for individual stations and by geographic districts, appear in Table I.

The averages for the various districts, with departures from the normal, are shown in the following table:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.6	+ 0.6	Missouri Valley	4.5	+ 0.5
Middle Atlantic	4.5	− 0.3	Northern Slope	4.2	+ 0.2
South Atlantic	4.6	− 0.2	Middle Slope	4.2	+ 1.0
Florida Peninsula	5.6	+ 0.1	Southern Slope	4.2	+ 0.6
East Gulf	4.5	+ 0.1	Southern Plateau	3.0	+ 0.7
West Gulf	3.8	− 0.5	Middle Plateau	3.4	+ 0.9
Ohio Valley and Tennessee	4.3	− 0.1	Northern Plateau	4.4	+ 0.3
Lower Lake	4.8	0.0	North Pacific	6.9	+ 1.6
Upper Lake	5.0	− 0.1	Middle Pacific	2.6	− 0.2
North Dakota	4.5	+ 0.2	South Pacific	2.5	0.0
Upper Mississippi Valley	5.0	+ 0.8			

DESCRIPTION OF TABLES AND CHARTS.

By Mr. WM. B. STOCKMAN, Chief, Division of Meteorological Records.

For description of tables and charts see page 20 of REVIEW for January, 1905.

TABLE I.—*Climatological data for U. S. Weather Bureau stations, September, 1905.*

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.								Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.					Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.			Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.					
New England.							**69.6**	**— 0.9**									**81**	**4.91**	**+ 1.8**										
Eastport	76	69	82	29.95	30.05	.00	54.1	— 1.7	72	8	60	33	27	48	22	51	48	85	4.32	+ 1.1	14	6,079	s.	42	se.	4	8	9	13	6.8
Portland, Me.	103	81	117	29.93	30.05	.00	58.4	— 1.3	79	22	65	38	27	52	25	54	51	80	5.35	+ 2.3	11	5,658	nw.	33	se.	3	12	6	12	5.5
Concord	288	70	79	29.74	30.06	.00	58.6	— 1.6	81	10	68	35	15	49	35	....	....	....	6.24	+ 3.0	13	3,171	nw.	25	nw.	26	11	7	12	5.8
Northfield	876	16	60	29.12	30.07	+ .01	55.4	— 0.6	77	10	65	30	15	46	34	52	50	86	4.35	+ 1.6	16	4,936	s.	30	nw.	24	7	11	12	6.5
Boston	125	115	181	29.92	30.06	— .01	62.0	— 0.4	81	22	69	41	27	55	25	57	54	77	5.10	+ 2.2	9	6,193	w.	30	nw.	25	10	5	15	5.6
Nantucket	12	14	90	30.05	30.06	— .02	62.0	— 0.7	74	6	67	45	27	56	18	58	55	82	4.07	+ 0.8	9	9,320	sw.	36	s.	4	10	11	9	5.3
Block Island	26	11	46	30.03	30.06	— .02	62.6	— 1.0	74	9	68	45	27	58	17	59	57	83	4.79	+ 1.9	11	9,805	sw.	44	nw.	13	11	7	12	4.9
Providence	159	57	67	29.89	30.06	— .01	61.8	.....	81	22	70	36	27	53	30	57	54	80	5.70	.....	9	4,098	nw.	26	se.	3	14	6	10	4.9
Hartford	159	115	132	29.89	30.06	— .01	62.6	.....	85	30	72	36	27	54	31	57	54	78	3.43	.....	9	3,388	s.	28	s.	3	13	6	11	5.3
New Haven	106	116	154	29.94	30.05	— .02	63.6	+ 0.1	85	30	72	37	27	55	29	59	56	80	5.07	+ 1.4	11	5,944	n.	34	se.	3	11	8	11	5.2
Mid. Atlantic States.							**67.1**	**+ 0.8**									**78**	**3.20**	**— 0.5**										**4.8**
Albany	97	102	115	29.95	30.05	— .02	62.6	— 0.5	88	30	72	39	27	53	34	57	54	81	3.37	0.0	11	4,489	s.	26	se.	3	9	8	13	5.6
Binghamton	875	79	90	29.13	30.06	— .01	60.7	— 0.3	87	19	71	32	27	50	35	....	....	....	2.63	— 0.7	13	3,441	nw.	23	n.	25	7	10	13	6.1
New York	314	108	350	29.72	30.06	— .02	66.8	+ 0.9	84	30	73	46	26	61	23	61	57	76	7.11	+ 3.4	9	7,561	nw.	38	se.	3	12	7	11	5.2
Harrisburg	374	94	104	29.67	30.07	— .01	66.6	+ 2.2	86	19	75	41	27	58	34	60	56	76	2.80	— 1.3	6	3,738	w.	24	n.	13	14	11	5	4.0
Philadelphia	117	116	184	29.95	30.07	— .01	68.6	+ 1.5	85	30	76	47	26	61	24	61	57	72	3.65	+ 0.4	7	6,282	nw.	30	n.	13	14	5	11	4.9
Scranton	895	111	119	29.21	30.07	.00	73.2	.....	86	19	73	35	27	54	35	58	55	79	3.23	.....	10	4,065	sw.	22	n.	20	8	15	7	5.1
Atlantic City	52	39	48	30.02	30.07	.00	67.4	+ 0.7	86	30	74	45	26	61	27	62	59	77	2.87	— 0.6	9	5,880	s.	30	s.	3	12	9	9	4.8
Cape May	17	48	52	30.07	30.09	+ .02	67.3	— 0.8	82	30	73	48	26	62	23	63	....	....	3.47	— 0.1	10	5,739	s.	32	s.	11	13	13	4	4.1
Baltimore	123	69	117	29.94	30.07	— .01	69.0	+ 1.1	88	20	78	45	27	60	31	62	58	72	2.14	— 1.7	5	4,525	nw.	24	n.	13	13	5	12	4.8
Washington	112	59	76	29.94	30.06	— .02	68.2	+ 0.4	88	19	78	41	27	58	35	62	60	82	2.34	— 1.4	5	3,530	nw.	17	nw.	25	19	8	3	3.4
Lynchburg	681	83	88	29.34	30.07	— .01	69.9	+ 0.9	90	19	80	45	27	59	35	63	61	81	2.15	— 1.7	8	1,616	nw.	15	nw.	13	15	12	3	3.9
Mount Weather	1,725	10	57	28.29	30.08	+ .01	64.2	.....	82	19	72	40	26	56	26	58	54	75	2.99	.....	6	9,351	nw.	38	nw.	12	13	12	5	4.1
Norfolk	91	102	111	29.98	30.08	+ .02	72.6	+ 1.5	90	20	80	50	27	65	25	66	64	81	3.92	— 0.6	10	5,304	s.	25	s.	3	16	6	8	4.4
Richmond	144	144	153	29.93	30.08	+ .01	71.7	.....	91	20	81	46	27	62	30	....	....	....	2.61	.....	8	4,491	s.	45	s.	3	14	11	5	4.1
Wytheville	2,293	40	47	27.75	30.09	+ .02	66.0	+ 2.4	86	1	77	44	27	55	35	59	57	85	1.91	— 1.5	8	2,355	nw.	16	w.	11	15	11	4	3.7
S. Atlantic States.							**75.6**	**+ 2.4**									**80**	**2.51**	**— 2.7**										**4.6**
Asheville	2,255	53	75	27.77	30.07	.00	67.8	+ 2.5	85	1	79	49	25	57	32	60	58	79	1.13	— 2.2	3	3,761	se.	24	se.	14	15	13	2	4.3
Charlotte	773	68	76	29.24	30.07	.00	74.0	+ 2.9	91	1	83	56	27	65	28	65	62	74	2.34	— 1.0	2	3,551	ne.	18	sw.	11	17	8	5	3.7
Hatteras	11	12	47	30.05	30.06	.00	75.6	+ 1.9	86	20	81	59	26	70	16	70	67	80	3.42	— 3.0	10	8,125	ne.	34	s.	17	15	10	5	3.8
Raleigh	376	71	79	29.67	30.06	— .01	73.0	+ 2.5	92	20	83	50	27	63	30	65	62	77	1.43	— 1.8	7	3,481	n.	19	ne.	14	15	8	7	3.8
Wilmington	78	82	90	29.95	30.03	— .02	75.1	+ 1.5	92	20	83	55	27	67	22	69	68	84	2.25	— 4.2	7	4,610	ne.	29	nw.	12	8	19	3	5.1
Charleston	48	14	92	29.99	30.04	.00	78.4	+ 2.4	92	7	84	67	15	73	16	73	71	88	2.16	— 4.4	9	7,201	e.	32	e.	14	7	18	5	5.2
Columbia, S. C.	351	41	57	29.67	30.04	— .01	76.4	+ 1.4	94	1	86	61	27	67	25	68	65	77	2.57	— 1.6	5	3,946	ne.	30	w.	4	12	14	4	4.4
Augusta	180	89	97	29.84	30.03	— .02	78.0	+ 3.6	96	23	88	61	7	68	29	69	66	75	0.53	— 3.4	3	3,900	ne.	24	sw.	4	13	15	2	3.9
Savannah	65	81	89	29.96	30.02	— .01	78.4	+ 2.6	93	1	85	67	10	72	20	72	71	85	3.11	— 3.0	8	4,908	sw.	24	e.	14	7	9	14	6.1
Jacksonville	43	101	129	29.94	29.99	— .01	79.8	+ 2.2	94	7	86	70	15	74	18	74	72	85	6.18	— 2.2	17	5,695	e.	28	n.	9	7	13	10	5.9
Florida Peninsula.							**81.6**	**+ 1.0**									**81**	**7.89**	**— 0.4**										**5.6**
Jupiter	28	10	48	29.93	29.96	.00	80.9	+ 1.3	90	17	87	71	3	75	17	76	74	82	10.77	+ 1.2	16	7,100	se.	38	se.	30	7	15	8	5.8
Key West	22	10	53	29.92	29.94	.00	82.6	+ 0.1	90	17	88	73	29	78	13	76	74	77	7.03	— 0.4	16	4,642	e.	42	nw.	28	6	18	6	5.6
Tampa	34	79	96	29.93	29.96	— .01	81.2	+ 1.6	93	19	89	70	12	74	20	75	73	84	5.88	— 2.0	15	4,621	ne.	26	w.	4	5	18	7	5.5
East Gulf States.							**77.8**	**+ 2.5**									**78**	**4.55**	**+ 0.8**										**4.5**
Atlanta	1,174	190	216	29.82	30.04	— .01	74.4	+ 2.9	89	23	83	58	5	66	22	66	63	76	2.62	— 1.1	7	7,241	w.	36	nw.	11	14	14	2	3.7
Macon	370	93	99	29.64	30.01	.00	77.6	.....	95	1	87	62	6	68	27	....	....	....	2.35	.....	6	3,942	ne.	30	nw.	2	11	12	7	5.0
Pensacola	56	79	96	29.93	29.99	.00	79.8	+ 2.3	92	23	87	68	22	73	23	....	....	....	9.23	+ 4.4	9	6,565	e.	41	s.	29	13	8	9	4.8
Birmingham	700	136	143	29.27	30.02	— .01	75.7	+ 0.8	90	1	85	57	5	67	30	....	....	....	0.76	— 2.1	5	5,159	n.	30	n.	2	9	15	6	5.0
Mobile	57	88	96	29.92	29.98	— .02	80.4	+ 3.6	96	9	89	65	23	72	28	72	70	80	3.73	— 1.4	7	3,407	nw.	24	e.	28	13	14	3	4.6
Montgomery	223	100	112	29.77	30.01	— .01	78.2	+ 2.6	95	23	88	62	6	68	29	69	66	76	2.83	— 0.1	6	4,119	n.	30	s.	11	17	9	4	3.7
Meridian	375	84	93	29.61	30.00	— .02	75.8	+ 2.8	91	26	86	55	22	65	32	....	....	....	1.93	— 0.9	10	3,289	e.	27	e.	28	15	8	7	3.9
Vicksburg	247	62	74	29.70	29.98	— .04	77.5	+ 2.2	95	8	87	60	5	68	26	70	68	81	4.20	+ 0.7	9	4,040	ne.	26	nw.	19	12	8	10	4.7
New Orleans	51	88	121	29.91	29.96	— .02	81.0	+ 2.7	93	9	88	68	30	74	18	73	71	79	11.09	+ 6.5	13	5,090	n.	34	ne.	28	9	12	9	5.4
West Gulf States.							**79.6**	**+ 2.6**									**77**	**2.06**	**— 2.0**										**3.8**
Shreveport	249	77	84	29.72	29.99	— .01	78.0	+ 2.5	94	7	88	60	23	68	29	69	67	76	0.96	— 2.8	6	3,799	ne.	21	se.	18	16	10	4	3.8
Fort Smith	457	79	94	29.52	29.99	— .02	75.0	+ 2.7	95	1	85	55	21	65	30	67	65	78	3.98	+ 0.4	9	4,744	e.	43	w.	18	15	9	6	3.6
Little Rock	357	93	100	29.63	30.00	— .03	75.0	+ 2.1	89	10	83	57	21	67	24	68	66	79	1.34	— 1.8	10	4,110	ne.	24	nw.	9	19	3	8	4.1
Corpus Christi	20	48	53	29.92	29.94	— .01	81.4	+ 2.6	90	1	87	70	29	76	18	75	73	84	3.37	— 1.4	6	7,279	se.	27	se.	18	13	14	3	3.8
Fort Worth	670	106	114	29.29	30.00	+ .01	78.2	.....	96	9	89	54	20	67	31	....	....	....	0.83	.....	6	6,194	e.	33	nw.	11	18	11	1	3.1
Galveston	54	106	112	29.90	29.96	— .02	82.0	+ 2.5	89	25	86	72	28	78	13	75	73	78	2.41	— 3.8	4	6,569	s.	28	ne.	27	19	8	3	3.3
Palestine	510	73	79	29.44	29.96	— .03	78.6	+ 2.9	93	7	88	61	23	69	27	70	66	75	0.59	— 2.7	7	4,482	ne.	19	sw.	18	13	13	4	4.2
San Antonio	701	80	91	29.21	29.92	— .04	80.4	+ 2.9	95	30	91	63	25	70	30	70	66	71	1.80	— 1.6	5	4,077	se.	24	nw.	3	12	9	9	4.6
Taylor	583	55	63	29.35	29.96	— .01	80.4	.....	96	30	91	63	24	70	32	....	....	....	0.40	.....	4	4,945	s.	27	s.	18	19	6	5	3.6
Ohio Val. and Tenn.							**69.6**	**+ 1.4**									**75**	**2.56**	**— 0.4**										**4.3**
Chattanooga	762	106	112	29.26	30.06	.00	74.0	+ 3.3	93	23	84	55	25	64	34	65	62	73	1.67	— 2.0	10	3,824	ne.	27	se.	29	14	8	8	4.5
Knoxville	1,004	35	88	29.02	30.06	.00	72.2	+ 2.9	89	18	83	52	25	62	33	64	61	77	0.55	— 2.2	9	3,676	n.	38	sw.	19	16	8	6	4.0
Memphis	399	76	97	29.61	30.03	.00	75.2	+ 3.1	89	18	84	59	5	67	23	68	65	77	1.42	— 1.7	7	4,975	n.	38	nw.	1	18	6	6	3.1
Nashville	546	79	91	29.48	30.06	.00	73.0	+ 2.3	91	23	83	53	21	63	32	64	61	74	6.12	+ 2.1	9	3,303	se.	28	sw.	9	16	5	9	4.1
Lexington	989	75	102	29.01	30.06	— .01	68.5	— 0.4	86	18	78	46	26	60	33	....	....	....	3.20	+ 0.7	6	5,629	sw.	24	s.	10	14	9	7	4.0
Louisville	525	114	136	29.49	30.07	+ .01	71.0	+ 1.6	91	18	81	50	26	61	35	62	58	71	2.95	+ 0.1	7	4,463	s.	24	sw.	2	14	5	11	4.9
Evansville	431	72	82	29.58	30.04	— .02	72.0	.....	90	18	81	53	26	63	34	....	....	....	2.84	.....	6	4,057	se.	22	s.	17	14	12	4	4.3
Indianapolis	822	154	164	29.18	30.06	.00	67.9	+ 1.9	87	1	77	47	26	59	32	60	56	73	2.13	— 0.8	6	5,874	s.	26	s.	19	11	10	9	5.1
Cincinnati	628	152	160	29.39	30.06	— .01	69.6	+ 1.5	88	18	79	48	27	60	36	61	56	68	1.54	— 0.9	5	3,830	se.	20	sw.	19	12	9	9	4.9
Columbus	824	173	190	29.20	30.06	— .01	67.1	+ 1.0	87	19	77	45	26	57	36	59	55	72	3.36	+ 0.8	8	6,211	sw.	29	w.	19	13	9	8	4.6
Pittsburg	842	336	352	29.17	30.07	— .01	65.8	— 0.9	86	19	75	42	26	56	32	59	55	74	4.41	— 0.2	6	5,626	nw.	29	n.	13	10	15	8	4.6
Parkersburg	638	77	84	29.42	30.07	— .01	67.6	— 0.6	90	19	79	39	27	56	42	60	57	79	3.58	+ 0.7	5	2,708	w.	17	w.	4	16	11	3	3.6
Elkins	1,940	41	50	28.08	30.11	+ .03	63.0	+ 0.7	87	19	77	34	26	49	45	55	54	87	1.83	— 1.8	9	1,884	n.	13	w.	4	17	8	5	4.0
Lower Lake Region.							**64.4**	**+ 1.3**									**76**	**2.23**	**— 0.7**										**4.8**
Buffalo	767	178	206	29.21	30.04	— .02	63.8	+ 1.7	86	19	71	39	26	57	23	58	54	74	2.42	— 0.9	14	8,832	sw.	45	sw.	24	5	18	7	6.1
Oswego	335	76	91	29.66	30.03	— .03	61.2	— 0.5	83	19	69	39	27	54	25	57	54	81	1.76	— 1.0	13	6,512	s.	28	n.	25	10	14	6	4.9
Rochester	523	81	102	29.49	30.05	— .01	63.8	+ 1.8	87	19	73	41	26	54	29	57	53	77	1.17	— 1.2	13	5,396	sw.	28	sw.	24	11	10	9	5.1
Syracuse	597	97	113	29.41	30.05	— .02	61.9	.....	85	19	70	38	14	54	25	....	....	....	2.53	.....	14	7,087	s.	36	s.	17	11	14	5	5.1
Erie	713	92	102	29.28	30.04	— .02	61.4	+ 0.5	87	19	71	42	26	57	26	58	54	72	2.90	— 1.1	10	6,637	s.	26	s.	15	8	15	7	5.3
Cleveland	762	190	201	29.24	30.06	.00	64.8	+ 1.0	86	19	72	44	26	57	26	59	57	78	2.37	— 1.1	10	8,905	se.	36	sw.	19	14	10	6	4.7
Sandusky	629	62	70	29.38	30.06	.00	66.1	+ 1.0	87	19	75	45	26	58	29	....	....	....	1.92	— 0.9	8	4,771	sw.	28	nw.	19	16	6	8	3.7
Toledo	628	120	127	29.38	30.06	.00	66.0	+ 2.1	89	28	76	44	26	56	30	59	55	74	2.05	— 0.3	6	5,863	sw.	32	w.	12	18	3	9	4.0
Detroit	730	153	193	29.26	30.06	.00	65.4	+ 2.5	87	28	74	45	26	56	28	59	55	76	3.27	+ 0.8	6	6,906	sw.	37	sw.	21	16	6	8	4.4
Upper Lake Region.							**62.2**	**+ 3.0**									**80**	**3.13**	**— 0.3**										**5.0**
Alpena	699	13	92	29.37	30.04	+ .01	60.2	+ 3.0	79	19	70	33	26	50	29	55	53	86	1.32	— 2.5	11	6,812	nw.	37	sw.	19	9	16	5	5.1
Escanaba	612	40	48	29.34	30.00	— .01	59.0	+ 2.3	76	21	68	36	13	50	28	56	53	83	2.21	— 1.4	7	5,081	s.	25	s.	14	14	7	9	4.3
Grand Rapids	707	127	165	29.27	30.04	.00	64.6	+ 1.7	89	29	74	43	26	55	28	58	55	79	4.07	+ 0.7	6	6,540	s.	40	e.	2	13	9	8	5.0
Houghton	668	66	74	29.25	29.97	— .03	60.4	.....	90	28	70	38	13	51	34	....	....	....	5.84	.....	10	5,083	e.	37	e.	2	15	6	9	4.6
Marquette	734	76	116	29.20	30.00	.00	61.0	+ 4.2	91	28	69	42	12	53	32	54	50	75	2.62	— 1.3	11	8,239	sw.	48	e.	2	13	8	9	5.4
Port Huron	638	70	120	29.35	30.04	— .02	63.4	+ 2.2	87	28	73	40	26	54	34	58	55	80	2.54	— 0.1	11	6,797	sw.	35	w.	22	15	5	10	4.5
Sault Ste. Marie	614	40	61	29.33	30.02	.00	59.3	+ 3.8	80	11	68	39	14	51	30	55	52	83	3.97	— 0.5	11	5,063	nw.	38	w.	21	12	10	8	4.9
Chicago	823	140	310	29.15	30.03	— .01	67.5	+ 3.3	86	18	74	52	26	60	27	60	56	72	4.18	+ 1.4	7	9,871	sw.	38	nw.	1	8	14	8	5.5
Milwaukee	681	124	142	29.30	30.03	.00	65.2	+ 4.0	86	28	73	47	13	57	28	58	55	76	0.76	— 2.1	9	7,441	w.	40	se.	1	12	7	11	4.7
Green Bay	617	49	86	29.34	30.00	— .02	62.7	+ 2.2	87	28	72	40	13	53	28	57	54	81	2.42	— 0.9	8	6,005	sw.	32	n.	12	6	14	10	6.0
Duluth	1,133	11	47	28.75	29.97	— .01	58.6	+ 3.2	82	11	66	38	13	51	29	53	51	83	7.72	+ 3.9	13	9,172	ne.	42	nw.	19	11	9	10	5.3

TABLE I.—*Climatological data for U. S. Weather Bureau stations, September, 1905*—Continued.

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.								Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.				Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.				Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.				
North Dakota.							60.6	+ 2.4									70	1.49	+ 0.1									4.5	
Moorhead	935	8	57	28.94	29.95	— .01	61.4	+ 4.9	89	28	74	42	12	49	40	54	52	81	1.60	— 0.5	7	5,722	se.	29	se.	30	9	14	7.7	4.6	
Bismarck	1,674	16	57	28.16	29.92	— .02	61.8	+ 4.8	97	28	76	37	4	48	43	51	46	67	0.94	— 0.2	9	7,915	se.	48	w.	30	17	7	6	4.1	
Devils Lake	1,482	11	44	28.36	29.92	— .02	58.9	.....	93	28	73	30	12	45	39	50	46	72	1.04	.....	8	8,284	se.	36	nw.	20	10	9	11	4.9	
Williston	1,875	14	44	27.93	29.89	— .04	58.5	+ 3.0	89	27	73	34	22	44	50	48	41	61	1.93	+ 1.1	4	8,146	se.	47	nw.	30	12	14	4	4.5	
Upper Miss. Valley.							67.0	+ 2.5									79	3.32	+ 0.1									5.0	
Minneapolis	.....	102	208	.....	.....	.....	63.7	+ 1.5	84	11	73	43	13	55	30	.....	.....	.....	6.50	+ 4.0	9	8,919	s.	40	n.	3	14	11	5	4.2	
St. Paul	837	171	179	29.06	29.96	— .03	64.0	+ 4.2	85	11	73	44	13	55	31	58	54	77	4.15	+ 1.2	9	6,823	se.	37	nw.	11	15	5	10	4.7	
La Crosse	714	71	87	29.22	29.98	— .03	64.6	+ 3.0	84	11	74	46	13	56	29	.....	.....	.....	2.54	— 1.7	8	4,721	s.	21	s.	26	14	7	9	4.8	
Madison	974	70	78	28.96	30.00	— .03	64.8	+ 2.7	87	28	74	46	26	56	29	58	54	76	0.58	— 2.7	5	5,924	se.	30	s.	18	14	9	7	4.1	
Charles City	1,015	8	58	28.92	29.99	— .01	62.8	— 1.3	85	27	74	41	23	52	36	57	56	88	2.00	— 1.2	12	4,491	se.	25	se.	30	12	8	10	5.0	
Davenport	606	71	79	29.35	30.00	— .03	67.9	+ 3.2	92	1	77	50	25	59	32	61	58	78	3.48	+ 0.3	7	4,766	e.	38	nw.	1	11	9	10	5.1	
Des Moines	861	84	101	29.10	29.99	— .03	67.3	+ 3.2	88	27	76	50	23	58	31	61	58	78	3.47	+ 0.3	10	5,088	s.	37	sw.	18	12	9	9	5.3	
Dubuque	698	100	117	29.27	30.01	— .02	67.0	+ 3.8	87	27	76	49	23	58	29	59	55	75	1.25	— 2.8	6	4,219	s.	23	s.	18	11	11	8	5.3	
Keokuk	614	63	78	29.34	30.00	— .03	68.6	+ 2.2	92	1	77	50	26	60	32	62	60	84	4.15	+ 0.6	11	4,722	sw.	36	w.	15	15	3	12	4.6	
Cairo	356	87	93	29.65	30.02	— .03	72.7	+ 2.8	88	28	81	56	27	64	30	66	64	80	0.69	— 1.9	6	4,475	n.	26	n.	2	10	10	10	5.3	
La Salle	536	56	64	29.47	30.04	.00	67.6	.....	90	1	78	46	26	57	36	.....	.....	.....	3.15	.....	7	4,654	sw.	26	sw.	19	9	10	11	5.4	
Peoria	609	11	45	29.38	30.04	.00	67.6	.....	93	1	78	45	23	57	39	.....	.....	.....	1.78	.....	11	5,185	se.	30	sw.	19	11	13	6	4.8	
Springfield, Ill.	644	82	93	29.34	30.02	— .03	68.7	+ 2.3	92	1	78	49	26	60	35	61	58	77	2.40	— 0.8	10	5,318	s.	33	w.	2	10	6	14	5.6	
Hannibal	534	75	109	29.44	30.00	— .03	68.2	+ 1.5	92	1	77	49	5	59	35	.....	.....	.....	6.40	+ 3.3	13	5,676	sw.	50	s.	14	12	4	14	5.5	
St. Louis	567	208	217	29.42	30.02	— .02	70.8	+ 1.4	92	1	78	55	5	63	24	63	60	75	5.56	+ 2.4	8	6,308	se.	45	n.	2	10	9	11	5.2	
Missouri Valley.							67.7	+ 2.5									72	5.63	+ 3.2									4.5	
Columbia, Mo	784	11	84	29.18	30.00	— .03	69.2	— 0.3	94	1	79	46	5	59	31	.....	.....	.....	11.54	+ 8.2	13	4,856	se.	31	e.	14	13	7	10	4.5	
Kansas City	963	78	95	28.99	30.01	— .01	70.8	+ 3.3	92	1	79	53	19	63	23	64	61	78	10.90	+ 7.4	13	5,180	se.	44	nw.	14	14	6	10	4.6	
Springfield, Mo	1,324	98	104	28.63	30.02	— .01	70.2	+ 2.5	89	1	79	50	3	61	26	64	62	80	4.76	+ 1.0	12	6,110	se.	40	w.	18	19	3	8	3.8	
Topeka	.....	85	89	.....	.....	.....	70.6	+ 1.9	92	1	80	49	4	61	29	.....	.....	.....	9.40	+ 6.1	12	5,619	s.	41	s.	17	16	7	7	4.3	
Lincoln	1,189	75	84	28.71	29.95	— .04	68.5	+ 2.4	91	24	79	46	4	58	34	61	57	77	6.91	+ 4.9	8	6,857	se.	34	ne.	15	12	8	10	5.0	
Omaha	1,105	115	121	28.81	29.97	— .03	68.8	+ 4.0	88	24	78	51	4	60	27	61	57	74	5.94	+ 3.0	8	5,324	s.	54	ne.	15	10	10	10	5.3	
Valentine	2,598	47	54	27.26	29.95	— .01	64.8	+ 3.2	96	23	79	36	19	51	45	54	48	64	1.45	+ 0.5	7	7,649	s.	44	s.	29	16	11	3	3.7	
Sioux City	1,135	96	164	28.76	29.95	— .03	65.7	+ 0.5	87	11	76	44	4	56	33	.....	.....	.....	6.37	+ 4.3	9	8,407	se.	50	se.	15	13	5	12	5.0	
Pierre	1,572	43	50	28.29	29.94	— .01	66.8	+ 3.1	97	28	80	42	4	53	42	55	47	60	0.34	— 0.6	5	5,725	se.	37	se.	29	13	12	5	3.9	
Huron	1,306	56	67	28.57	29.96	.00	63.8	+ 3.7	95	11	78	36	4	50	47	55	50	72	1.04	— 0.4	8	8,367	se.	37	se.	29	14	11	5	4.0	
Yankton	1,233	55	65	28.64	29.94	— .04	65.6	+ 3.5	89	11	77	42	4	54	36	.....	.....	.....	3.14	+ 0.3	10	6,260	s.	36	n.	18	11	9	10	5.5	
Northern Slope.							61.4	+ 3.3									56	0.88	— 0.1									4.2	
Havre	2,505	11	44	27.27	29.87	— .07	60.2	+ 5.3	91	24	74	31	30	46	46	50	42	58	0.12	— 1.1	5	7,105	nw.	42	sw.	24	7	19	4	5.1	
Miles City	2,371	26	48	27.40	29.91	— .04	65.0	+ 5.0	95	10	79	44	30	51	43	52	43	53	1.45	+ 0.7	3	4,433	n.	36	w.	14	11	13	6	4.4	
Helena	4,110	8	56	25.79	29.92	— .05	59.4	+ 3.6	87	22	72	34	30	47	39	46	36	49	0.34	— 0.8	3	5,222	w.	47	w.	24	10	15	5	4.6	
Kalispell	2,962	11	34	26.88	29.88	— .08	56.2	.....	84	23	69	29	30	43	42	46	39	60	1.21	.....	8	3,533	w.	30	w.	10	10	9	11	5.5	
Rapid City	3,234	46	50	26.58	29.95	— .01	62.4	+ 1.0	90	10	76	39	3	49	44	51	44	60	0.85	+ 0.3	5	5,529	w.	30	nw.	30	21	3	6	2.9	
Cheyenne	6,088	56	64	24.06	29.94	— .02	58.7	+ 2.5	86	23	74	36	30	43	44	45	36	52	1.06	+ 0.2	7	5,880	nw.	42	w.	30	13	8	9	4.7	
Lander	5,372	26	36	24.66	29.94	— .02	57.9	+ 2.1	89	23	76	32	19	40	49	45	36	53	1.11	+ 0.2	2	2,677	sw.	30	nw.	4	16	12	2	3.4	
Yellowstone Park	6,200	11	47	23.91	29.93	— .04	53.8	.....	83	23	68	25	18	39	41	41	30	48	1.17	.....	8	6,034	sw.	37	sw.	28	10	18	2	4.4	7.1
North Platte	2,821	43	52	27.07	29.96	— .01	65.9	+ 3.5	90	23	79	37	30	52	42	57	53	72	1.23	0.0	7	6,093	se.	35	se.	29	19	6	5	3.2	
Middle Slope.							70.4	+ 2.7									64	2.47	+ 0.7									4.2	
Denver	5,291	129	136	24.76	29.94	— .02	63.2	+ 3.3	90	23	80	41	30	51	38	50	41	50	0.49	— 0.3	6	5,098	s.	39	sw.	29	13	14	3	3.8	
Pueblo	4,685	80	86	25.30	29.92	— .04	66.3	+ 1.1	91	13	82	37	19	51	51	52	43	52	0.46	+ 0.1	6	4,608	se.	38	nw.	30	16	11	3	3.8	
Concordia	1,398	42	47	28.52	29.96	— .03	70.9	+ 3.1	93	14	82	45	4	60	34	62	58	73	3.59	+ 1.1	4	5,223	s.	26	s.	17	9	17	4	4.7	
Dodge	2,509	44	54	27.39	29.95	— .03	71.7	+ 4.1	99	16	84	42	19	59	39	62	57	71	1.70	+ 0.4	7	6,624	se.	31	se.	25	9	17	4	4.8	
Wichita	1,358	78	86	28.57	29.98	— .02	72.8	+ 2.8	100	1	84	47	19	62	32	64	59	71	6.70	+ 3.8	8	5,743	se.	28	sw.	18	14	9	7	4.2	
Oklahoma	1,214	79	86	28.70	29.95	— .04	75.6	+ 1.8	96	1	86	51	19	65	30	66	61	68	1.86	— 0.8	4	6,604	s.	34	sw.	18	17	7	6	3.9	
Southern Slope.							74.0	+ 3.0									65	3.12	+ 0.6									4.2	
Abilene	1,738	45	54	28.19	29.96	.00	77.6	+ 3.0	97	17	89	53	20	66	29	65	60	65	3.16	+ 0.7	7	4,739	s.	22	nw.	7	6	16	8	5.5	
Amarillo	3,676	10	49	26.29	29.95	— .01	70.3	+ 2.9	96	1	82	44	19	58	34	59	54	64	3.08	+ 0.5	4	8,594	s.	43	sw.	18	20	7	3	2.9	
Roswell	3,578	9	57	26.34	29.90	— .02	71.4	.....	97	16	86	44	19	57	39	60	54	67	0.64	.....	8	3,622	s.	26	nw.	5	12	14	4	4.2	
Southern Plateau.							71.9	+ 0.8									50	1.67	+ 0.8									3.0	
El Paso	3,762	10	110	26.19	29.88	.00	74.8	+ 1.7	96	1	86	56	19	64	33	61	54	57	2.29	+ 1.2	7	6,034	e.	35	ne.	23	14	8	8	4.4	
Santa Fe	7,013	33	39	23.34	29.91	— .02	61.0	+ 1.1	83	1	72	36	30	50	35	49	42	58	1.49	0.0	11	4,587	sw.	31	se.	22	17	10	3	3.4	
Flagstaff	6,907	12	44	23.42	29.89	.00	56.6	— 0.9	82	1	72	26	30	42	43	47	41	65	4.23	+ 2.1	10	4,501	sw.	36	sw.	17	17	5	8	3.9	
Phoenix	1,108	50	56	28.66	29.78	— .03	81.2	+ 2.8	106	13	98	51	30	71	37	65	54	41	1.23	+ 0.6	6	3,208	e.	32	se.	22	16	11	3	3.3	
Yuma	141	16	46	29.62	29.76	— .02	84.4	— 0.3	106	14	99	55	30	70	43	67	58	48	0.52	+ 0.4	3	3,721	w.	30	nw.	28	26	3	1	0.9	
Independence	3,910	11	42	25.93	29.84	— .02	70.1	+ 0.1	93	2	85	40	28	55	36	51	32	28	0.25	+ 0.2	1	4,913	nw.	40	n.	28	21	9	0	2.1	
Middle Plateau.							62.7	+ 0.5									43	1.03	+ 0.5									3.4	
Carson City	4,720	82	92	25.27	29.89	— .06	60.6	+ 1.1	90	1	78	29	30	44	48	47	35	42	0.04	— 0.2	2	4,418	sw.	49	w.	27	22	7	1	1.6	
Winnemucca	4,344	18	56	25.60	29.95	+ .02	60.0	+ 0.1	90	2	80	24	29	40	54	43	28	36	0.08	— 0.2	1	3,772	sw.	32	sw.	23	18	6	6	3.1	
Modena	5,479	10	43	24.61	29.88	— .04	60.6	+ 0.7	89	1	78	29	30	44	48	45	31	41	1.26	+ 0.8	7	7,604	w.	43	sw.	27	14	13	3	3.6	
Salt Lake City	4,366	105	110	25.61	29.91	— .04	65.3	+ 1.0	91	2	77	37	29	53	38	49	35	39	2.07	+ 1.1	10	4,406	se.	38	w.	5	17	6	7	3.8	
Durango	6,546	18	56	23.71	29.91	— .02	59.2	.....	87	2	75	31	30	44	44	47	37	54	2.76	.....	11	4,021	nw.	28	sw.	29	12	12	6	4.3	
Grand Junction	4,608	43	51	25.39	29.92	— .03	67.2	0.0	91	13	80	41	30	54	36	52	40	44	1.69	+ 0.8	9	3,397	se.	26	sw.	17	17	5	8	3.8	
Northern Plateau.							62.5	+ 2.2									46	1.16	+ 0.4									4.4	
Baker City	3,471	52	58	26.43	29.98	— .01	58.3	+ 2.5	88	2	73	34	18	44	43	46	34	46	0.90	+ 0.2	4	4,400	nw.	24	nw.	24	11	11	8	4.6	
Boise	2,739	61	68	27.12	29.94	— .03	63.6	+ 2.8	91	22	78	38	18	49	42	49	34	38	0.19	— 0.2	3	3,833	nw.	27	nw.	27	15	10	5	3.9	
Lewiston	757	10	51	29.12	29.93	— .05	64.6	+ 2.3	92	11	78	40	29	51	44	.....	.....	.....	2.74	+ 1.8	8	3,959	e.	44	w.	2	14	9	7	4.3	
Pocatello	4,483	46	54	25.48	29.93	— .03	62.2	+ 1.7	89	22	76	30	18	48	44	46	30	36	0.76	+ 0.1	4	6,381	e.	28	sw.	27	18	9	3	3.1	
Spokane	1,929	101	110	27.92	29.94	— .04	60.5	+ 2.4	91	23	72	35	29	49	37	50	41	55	0.55	— 0.4	7	4,819	sw.	28	sw.	24	6	9	15	6.4	
Walla Walla†	1,000	71	79	28.87	29.94	— .06	65.6	+ 1.7	90	23	77	43	29	55	38	56	48	56	1.91	+ 1.0	7	3,802	s.	20	sw.	12	14	10	3	4.3	
N. Pac. Coast Reg.							58.2	+ 1.1									81	4.11	+ 1.2									6.7	
North Head	211	11	56	29.77	29.99	— .04	56.8	— 0.2	87	1	60	46	27	53	34	53	54	90	5.62	+ 1.9	15	11,201	se.	77	se.	25	8	5	17	6.7	
Port Crescent	259	12	29	29.71	29.99	— .03	53.8	+ 1.0	73	11	61	36	6	47	29	.....	.....	.....	4.90	+ 1.5	13	3,162	w.	15	sw.	19	4	8	18	7.0	
Seattle	123	185	224	29.87	30.00	— .01	59.4	+ 1.0	79	1	66	47	29	53	27	56	53	82	1.70	— 0.1	13	6,384	s.	42	s.	26	0	10	20	8.2	
Tacoma	213	113	120	29.75	29.97	— .05	59.4	+ 3.2	78	1	67	44	29	52	27	.....	.....	.....	2.79	+ 0.6	13	4,240	sw.	28	sw.	16	2	12	16	7.3	
Tatoosh Island	86	7	57	29.86	29.95	— .06	54.8	+ 1.0	64	1	59	46	26	51	13	53	51	90	10.21	+ 3.6	20	10,643	s.	60	s.	19	1	8	21	7.9	
Portland, Oreg.	153	68	96	29.83	29.98	— .05	62.0	+ 1.3	87	1	71	45	15	53	31	56	51	74	2.79	+ 1.0	11	3,599	nw.	28	ne.	1	4	10	16	7.1	
Roseburg	498	56	60	29.44	29.98	— .04	61.4	+ 0.5	86	22	74	42	15	49	39	54	49	70	0.75	— 0.3	7	2,260	nw.	18	sw.	25	16	7	7	3.9	
Mid. Pac. Coast Reg.							64.9	+ 0.4									63	0.11	— 0.6									2.6	
Eureka	62	62	80	29.96	30.03	+ .02	57.0	+ 2.6	68	25	62	45	29	52	17	54	52	85	0.38	— 1.0	6	3,988	nw.	32	n.	17	8	13	9	5.3	
Mount Tamalpais	2,375	11	18	27.52	29.96	+ .02	65.2	.....	91	22	72	43	28	58	26	55	48	58	0.06	.....	2	11,306	nw.	62	nw.	29	21	7	2	2.1	
Red Bluff	332	50	56	29.53	29.88	— .05	73.4	— 0.4	99	22	88	49	28	59	39	56	42	37	0.02	— 0.6	1	3,330	n.	26	.....	17	25	4	1	1.5	
Sacramento	69	106	117	29.82	29.89	.00	68.9	— 0.6	97	22	83	48	30	54	38	57	48	55	0.03	— 0.3	1	5,481	se.	22	sw.	23	26	3	1	1.1	
San Francisco	155	161	167	29.80	29.97	+ .03	60.4	0.0	87	21	67	51	6	54	35	55	52	80	T.	— 0.3	0	7,358	w.	31	w.	5	17	12	1	3.0	
S. Pac. Coast Reg.							67.8	— 0.5									66	0.12	0.0									2.5	
Fresno	330	67	70	29.53	29.87	.00	73.0	— 1.5	102	22	90	42	30	56	43	56	40	38	T.	— 0.2	0	4,248	nw.	24	nw.	27	26	3	1	1.0	
Los Angeles	338	116	123	29.52	29.87	— .01	68.8	+ 0.3	91	26	80	52	12	58	32	59	54	70	T.	— 0.1	0	3,635	w.	24	s.	22	13	15	2	2.9	
San Diego	87	94	102	29.77	29.86	— .03	66.4	— 0.6	81	23	72	53	30	61	24	62	59	82	0.50	+ 0.4	2	4,063	nw.	24	s.	22	26	3	2	3.0	
San Luis Obispo	201	47	54	29.71	29.93	.00	63.1	— 0.3	97	20	76	42	29	50	48	55	50	73	T.	— 0.1	0	3,734	nw.	28	w.	28	18	10	2	3.1	
West Indies.																													
Grand Turk	11	6	20	29.93	29.94	.....	83.3	.....	92	*	90	69	6	76	.....	.....	.....	.....	2.16	.....	11	.....	e.	30	e.	6	.....	.....	.....	.....	
Havana‡	57	87	105	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
San Juan	82	48	90	29.84	29.92	— .02	80.5	— 0.5	89	15	86	70	29	75	14	76	74	82	7.15	+ 2.0	20	6,151	e.	39	se.	7	8	17	5	5.2	

• More than one date. †Record for 27 days. ‡ Station discontinued September 4, 1905.

TABLE II.—*Climatological record of cooperative observers, September, 1905.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alabama.	°	°	°	*Ins.*	*Ins.*
Alaga				3.70	
Anniston	92	46	71.6	1.44	
Ashville	90	50	72.7	0.64	
Benton				2.12	
Bermuda	96	58	77.8	4.64	
Boligee	96	52	77.0	1.31	
Bridgeport				0.71	
Burkeville				1.40	
Calera				0.96	
Camp Hill	97	56[2]	76.9[2]	2.15	
Citronelle	97	63	79.1	3.05	
Clanton	95	53	75.8	0.78	
Cordova	92	48	74.2	2.98	
Dadeville				1.54	
Daphne	94	65	79.8	12.46	
Decatur	88	54	73.3	2.97	
Delmar	92	54	74.4	4.92	
Demopolis				1.22	
Eufaula	93	60	77.0	3.79	
Evergreen	96	60	78.2	2.76	
Flomaton	99	59	79.2	5.37	
Florence	92	50	74.0	4.13	
Fort Deposit	94	60	78.0	1.32	
Gadsden	96	54	76.1	2.64	
Goodwater	95	55	75.8	2.00	
Greensboro	92	50	77.2	1.80	
Greenville				2.60	
Guntersville				3.56	
Hamilton	97[1]	53[1]	76.0[1]	2.60	
Letohatchie				1.36	
Livingston	92	55	76.3	0.57	
Lock No. 4	95	53	75.6	1.40	
Lucy	98	60	78.2	4.45	
Madison Station	93	51	75.0	5.30	
Maplegrove	94	53	74.2	3.18	
Marion	93	58	76.9	0.97	
Milstead				2.90	
Newbern	96	54	77.4	2.28	
Notasulga				0.68	
Oneonta	91	50	72.6	3.66	
Opelika	94	61	77.0	1.41	
Ozark	97	62	78.7	1.92	
Prattville	94	55	77.0	3.77	
Pushmataha	95	54	76.0		
Riverton	92	49	73.8	5.54	
Scottsboro	91	51	74.8	0.98	
Selma	98	60	79.3	1.60	
Springhill				5.75	
Talladega	96	53	74.4	0.92	
Tallassee				1.26	
Thomasville	96	60	78.6	1.79	
Tuscaloosa	94	55	76.4	1.60	
Tuscumbia	90	55	74.0	4.85	
Tuskegee	102	60	79.8	0.50	
Union Springs	92	61	77.4	3.02	
Uniontown	97	52	75.0	1.71	
Valleyhead	98°	50°	73.1°	1.54	
Vienna				1.54	
Wetumpka	100	53	78.2	1.26	
Alaska.					
Chestochena	59	16	38.6	3.11	0.6
Ketchumstock	62	9	33.0	2.16	4.0
Sitka	64	35	50.8	8.80	
Arizona.					
Allaire Ranch				1.27	
Alpine				3.74	
Arizona Canal Co. Dam	109	52	85.6	1.09	
Benson	99	35	70.4	2.83	
Blue	86	34	63.5	4.87	
Bowie	99	32	71.3	3.48	
Buckeye	110	49	82.4	0.58	
Casagrande	112	50	87.0	0.60	
Cochise[1]	98	43	72.0	2.30	
Congress	99	48	80.1	1.13	
Douglas	99	48	76.3	1.86	
Dudleyville	99	47	77.2	1.90	
Duncan	103	34	71.8	1.66	
Flagstaff				4.02	2.0
Fort Apache	93	29	65.8	3.10	
Fort Defiance	85	28	57.2	2.55	
Fort Huachuca	91	35	65.5	4.85	
Fort Mohave	113	58	83.7	1.31	
Guabend	111	60	87.1	1.03	
Globe	98	43	76.1	2.38	
Grand Canyon	90	36	60.0	3.95	1.0
Greaterville	89	50	71.4	3.75	
Greer				3.69	
Holbrook	99	33	68.2	1.37	
Huachuca Res				5.70	
Jerome	93	44	72.6	3.60	
Kingman	97	42	73.6	1.40	
Maricopa	114	46	85.8	0.41	
Mesa	109	50	84.1	0.92	
Mohawk Summit[1]	110	70	91.1	0.32	
Natural Bridge				4.17	
Nutrioso				2.60	
Oracle	94	45	74.5	2.14	
Parker	115	48	86.0	0.64	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Arizona—Cont'd.	°	°	°	*Ins.*	*Ins.*
Phoenix	107	47	81.8	0.72	
Picacho[1]	108	55	85.5	2.11	
Pinal Ranch				2.65	
Pinto				2.25	
Prescott	96	30	67.6	1.73	
Roosevelt	109	52	82.6	2.79	
San Carlos	103	45	78.6	1.85	
San Simon	101	44	73.4	0.80	
Seligman	92	39	65.4	1.52	
Sentinel[1]	109	57	84.0	0.45	
Showlow				3.40	
Taylor	94	30	64.7	2.60	
Tempe	111	47	82.6	1.13	
Thatcher				1.82	
Tombstone	89	46	71.0	2.10	
Tonto	103	45	78.2	0.77	
Tucson	103	45	80.4	2.84	
Upper San Pedro	98	48	74.0	1.29	
Vail[as]	105	65	84.5	0.41	
Walnut Grove				1.79	
Willcox	96	42	72.8	1.58	
Williams	86	29	63.0	2.45	1.0
Yarnell				0.78	
Young	98	38	69.2	3.02	
Arkansas.					
Alicia	88	50	72.6	1.85	
Amity	97	52	75.0	3.81	
Arkadelphia	95	53	76.0	2.74	
Arkansas City				2.12	
Arnett	87	49	70.8	6.78	
Batesville	91	53	74.3	3.15	
Beebranch	90	47	72.0	4.30	
Blackrock				4.19	
Blanchard	92	49	74.1	2.81	
Brinkley	96	52	75.6	1.64	
Calico Rock				3.90	
Camden	92	54	76.2	5.55	
Clarendon				2.62	
Conway	93	51	75.7	3.62	
Corning	90	52	72.3	2.78	
Dallas	91	53	74.5	3.11	
Dardanelle				5.68	
Des Arc	93	49	75.6	1.44	
Dodd City	91	46	71.6	3.90	
Dutton	89	45	69.0	6.70	
Eldorado	97	55	76.1	3.63	
Eureka Springs	94	46	71.6	3.69	
Fayetteville	94	48	72.8	7.23	
Forrest City	91	50	74.6	2.34	
Fulton				3.62	
Hardy	90	52	72.5	4.69	
Heber	97	45	75.0	5.03	
Helena	94	54	75.6	2.42	
Hope	98	55	77.7	3.72	
Howe	100	55	78.2	4.09	
Huntsville	91	50	72.2	5.59	
Lacrosse	91°	53°	73.0°	2.95	
Lake Village	97	55	75.7	4.41	
Lonoke	97	50	75.7	2.06	
Lutherville	92	46	73.5	6.72	
Luxora				0.50	
Malvern	95	52	75.0	4.45	
Marked Tree				2.39	
Marvell	93	51	75.6	4.12	
Mossville	85	48	69.5	4.51	
Mountain Home	89°	48°	70.0°	5.19	
Newport	93[3]	52	74.8[3]	4.39	
Oregon	93	44	70.0	5.46	
Osceola	92	51	74.8	1.13	
Ozark	94	51	75.4	3.51	
Perry	90	60	76.0	5.60	
Pinebluff	95	54	75.4	4.22	
Pocanontas	90	50	73.2	3.08	
Pond	91	45	71.4	4.87	
Prescott	95	56	76.8	3.73	
Princeton	95	50	76.2	3.39	
Rison	98	53	77.0	3.77	
Russellville	94	51	72.9	6.31	
Silversprings	91	48	71.6	6.08	
Spielerville	93	53	75.0	5.63	
Stuttgart	97	49	75.0	1.76	
Tate	98	47	75.4	5.55	
Texarkana	95	54	74.2	5.22	
Warren	96	51	76.2	6.07	
White Cliffs				1.10	
Wiggs	93	48	74.2	3.32	
Winchester	96	52	76.4	2.95	
Witts Springs	87°	50°	70.1°	4.65	
California.					
Alturas				0.27	
Angiola	107	37	73.0	T.	
Auburn	100	41	70.0	0.05	
Azusa	101	44	70.2	0.02	
Bagdad	106	60	84.6	0.40	
Bakersfield	104	52	77.1	T.	
Barber				T.	
Barstow	104	46	74.4	0.00	
Bear Valley				0.61	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Berkeley	84	46	60.4	0.00	
Bishop	93	36	65.4	0.41	
Blue Canyon	84	34	59.5	0.38	
Bodie	83	— 1	47.2	0.60	
Bowman				0.49	
Branscomb	95	35	61.3	0.18	
Brush Creek	94	30	63.3	0.53	
Butte Valley				0.84	5.0
Calexico	105	50	83.4	0.13	
Campbell	96	36	63.0	T.	
Campo				0.68	
Cedarville	100	24	62.2	0.46	
Chico	95	41	70.4	T.	
Cloverdale	102	40	68.8	0.07	
Colusa	94	48	70.5	0.00	
Craftonville				0.62	
Crescent City	71	40	55.4	1.86	
Crockers				0.85	
Cuyamaca	82	38	60.5	1.01	
Delta	100	37	69.0	0.12	
Diamond				0.02	
Dobbins	102	40	73.6	0.35	
Drytown	96	40	68.9	0.00	
Durham	104	42	71.9	T.	
Elcajon	104	42	71.0	0.57	
Electra	102	48	73.2	0.00	
Elmwood	107	42	70.8	0.00	
Elsinore	104	44	73.9	T.	
Emigrant Gap	78	38	62.6	1.00	
Escondido	94	36	65.2	0.00	
Folsom	107	43	73.6	0.05	
Fordyce				0.60	1.0
Fort Ross	73	44	56.8	0.19	
Fruitvale				T.	
Georgetown	95	38	68.0	0.16	
Gilroy (near)	104	40	64.0	0.03	
Grass Valley				0.18	
Greenville	97	25	58.9	0.73	
Hanford	101	42	73.6	0.07	
Hollister	103	41	64.7	0.05	
Indio	110	48	85.2	T.	
Idylwild	89	33	63.2	0.38	
Imperial	112	49	83.0	0.04	
Iowa Hill	94	48	68.4	0.25	
Irvine				0.00	
Isabella	98	37	71.4	0.21	
Jolon				0.00	
Kennedy Gold Mine				0.04	
Kentfield				0.08	
King City	106	35	67.0	0.00	
Laporte	81	34	57.0	1.33	T.
Le Grand	99	52	75.9	T.	
Lick Observatory	86°	35°	62.2°	0.02	
Livermore	105	44°	68.8	T.	
Lodi	98	43	67.0	0.03	
Lone Pine	92	35	66.4	0.15	
Los Gatos	98	44	66.7	T.	
Magalia	99	38	71.4	0.48	
Mammoth	110	51	86.0	0.00	
Marysville	101	42	69.6	0.07	
Merced	106	35	69.8	0.00	
Mercury				T.	
Mills College				T.	
Milo				0.18	
Milton (near)	98	43	72.0	T.	
Mokelumne Hill	99	44	71.2	0.05	
Montague	95	28	63.2	0.20	
Monterio	92	40	67.8	0.42	
Monumental	91	33	58.4	2.90	
Mount St. Helena				0.06	
Napa	100	46	67.5	T.	
Needles	107	55	83.2	0.50	
Nellie				0.44	
Nevada City	96	30	63.9	0.30	
Newcastle	100	55	75.1	0.07	
Newman	104	48	73.5	T.	
Niles	94	40	64.8	0.02	
Nordhoff	92	40	64.0	0.10	
North Bloomfield	95	35	65.6	0.33	
Oakland	83	52	63.0	T.	
Orland	104	48	74.5	T.	
Orleans	104	44	71.1	1.35	
Oroville (near)	99	44	72.8	T.	
Ozena				0.18	
Palermo	103	40	70.4	T.	
Paso Robles	102	38	68.5	0.00	
Peachland	100	36	64.2	0.04	
Pilot Creek				0.21	T.
Pine Crest	91	50	67.6	0.01	
Placerville	92	32	62.4	0.18	
Point Lobos	72	54	62.0	T.	
Point Reyes Light	76	48	55.4	T.	
Porterville	103	43	73.2	0.08	
Poway	92	45	70.8	0.32	
Quincey	85	30	58.0	0.87	T.
Redding	95	45	72.4	0.03	
Redlands	103	47	73.4	0.00	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Reedley	104	43	73.2	T.	
Represa				T.	
Riovista	93	50	69.6	0.05	
Riverside	103	41	69.6	0.08	
Rocklin	102	43	71.5	0.00	
Rohnerville				0.68	
Sacramento	88	45	65.8	0.04	
Salton				0.00	
San Bernardino	105	42	71.7	0.13	
San Jacinto	104	42	70.3	0.00	
San Jose	95	42	66.3	T.	
San Miguel Island				0.49	
Santa Barbara	91	50	66.5	0.03	
Santa Clara College	98	37	64.4	T.	
Santa Cruz	96	36	61.4	0.00	
Santa Maria	86	40	62.4	0.07	
Santa Rosa	101	39	65.1	T.	
Sausalito				T.	
Shasta	101	59	81.3	T.	
Sierra Madre	94	48	69.2	T.	
Sisson	90	31	60.0	0.10	
Sonoma	97	40	64.6	T.	
Sonora	90	50	72.4	0.20	
Southeast Farallon	62	48	54.8	0.00	
Sterling				0.95	
Stockton	96	48	68.4	0.04	
Storey	102	39	71.0	0.00	
Summerdale	86	30	62.0	0.55	
Susanville	87	28	53.4	0.50	
Tejon	93	50	72.8	0.35	
Topaz				0.13	
Towle	89	39	62.8	0.29	
Truckee	86	32	57.0	0.25	
Tulare	102	40	71.0	0.11	
Tustin				T.	
Ukiah	104	34	66.6	T.	
Upland	94	44	68.4	0.17	
Upperlake	99	28	64.6	0.05	
Upper Mattole				1.21	
Vacaville	103	45	69.8	T.	
Ventura	85	48	64.3	0.32	
Visalia	102	45	71.6	0.00	
Wasco	110	40	73.2	T.	
Westpoint				0.16	
West Saticoy				T.	
Wheatland	95	43	69.4	0.12	
Willow	100	58	78.4	0.00	
Woodside	90	42	64.0	T.	
Yosemite	93	33	63.0	0.86	
Yreka				0.15	
Zenia	93	32	60.8	0.50	
Colorado.					
Akron				0.83	
Alford	88	30	57.8	0.96	
Antelope Springs	73	16	46.4	3.70	T.
Ashcroft	78	22	49.3	1.25	
Blaine	92	38	68.2	0.71	
Boulder	88	39	66.0	1.64	
Breckenridge	73	19	48.2	0.94	
Buenavista	82	31	56.7	0.35	0.1
Burlington	91	36	66.5	1.75	
Canon City	94	39	66.2	0.02	
Cardinal	75	28	52.3	0.69	T.
Castlerock	90[e]	30[e]	61.8[e]	0.70	
Cheesman	85	32	60.2	1.45	
Cheyenne Wells	91	39	67.6	2.41	
Clearview	72	26	51.2	1.33	
Collbran	88	31	60.0	2.87	
Colorado Springs	86	37	61.8	0.48	
Cripplecreek				1.39	
Delta	95	30	65.0	1.17	
Eagle	86	24	55.0	1.69	
Fort Collins	90	31	60.4	0.28	
Fort Morgan[b]	93	35	66.1		
Fowler				0.68	
Fox	92	40	66.2	1.59	
Frances	78	30	55.9	0.57	T.
Fruita	93	35	64.3	2.23	
Garnett	83	21	53.4	0.96	
Gleneyre	85	30	60.7	0.78	
Glenwood Springs	86	25	57.0	0.87	
Grand Valley	93	30	62.8	2.28	
Greeley	93	33	64.0	0.17	
Gunnison	81	19	52.2	0.52	
Hahns Peak	77	20	49.5	1.72	1.0
Halls Gulch	68[a]	21[b]	44.0[b]		
Hamps	85	32	61.8	2.23	
Hoehne	91	31	63.2	0.84	
Holly	99	35	70.2	2.00	
Holyoke	93	33	66.6	1.26	
Idaho Springs	77	39	57.9	0.45	
Lake City	78	29	53.5	0.90	1.0
Lake Moraine	66	24	48.5	0.90	5.0
Lamar	99	39	72.6	0.82	
Laporte				0.29	
Las Animas	97	37	69.9	1.15	
Lay	84	23	56.4	2.22	T.
Leroy	92	38	65.3	0.78	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Colorado—Cont'd.	°	°	°	*Ins.*	*Ins.*
Longs Peak	70	25	47.2	0.46	
Mancos	89	28	59.8	2.82	
Meeker	83	27	56.0	2.47	
Montrose	83	26	58.2	0.99	
Moraine	80	29	54.6	0.40	
Pagoda	89	26	57.0	1.77	
Paonia	87	36	63.9	1.54	
Platte Canon				1.24	
Rockyford	91	36	66.6	1.48	
Saguache	84	26	55.5	0.58	
Salida	86	25	57.4	0.62	
San Luis	81	21	55.6	0.85	0.4
Santa Clara	83	29	57.8	1.35	
Sapinero	82	22	53.8	1.33	0.5
Sheridan Lake	95	36	68.2	2.78	
Silt	89	31	61.0	2.07	
Silverton	76	20	49.0	2.77	
Stonewall				1.77	
Sugar City				1.28	
Trinidad	88	36	65.4	0.68	
Victor	77	27	53.6	2.11	0.8
Vilas				1.61	
Wagon Wheel	79	13	48.8	1.46	
Waterdale	90	32	61.8	0.24	
Westcliffe	81	23	56.4	0.66	
Whitepine	76	19	48.4	1.20	1.9
Wray	91	37	66.6	2.19	
Yuma				1.91	
Connecticut.					
Bridgeport	88	35	64.4	6.16	
Canton	82	29	58.3	5.41	
Colchester	82	30	60.6	4.98	
Falls Village				6.51	
Hawleyville	83	32	61.4	3.13	
New London	80	38	62.6	3.54	
North Grosvenor Dale	87	31	61.0	5.88	
Norwalk	83	32	62.0	7.53	
Southington	83	30	60.9	4.05	
South Manchester				2.94	
Storrs	81	32	59.7	5.79	
Voluntown	85	28	61.0	6.42	
Wallingford				3.86	
Waterbury	89	31	62.8	4.27	
West Cornwall	84	33	60.7	6.83	
West Simsbury				4.76	
Delaware.					
Delaware City				4.80	
Milford	91	39	69.4	5.19	
Millsboro	91	38	68.0	3.77	
Newark	86	38	67.0	4.08	
Seaford	82	40	66.7	6.19	
District of Columbia.					
Distributing Reservoir[*b]	85	49	69.0	2.07	
Receiving Reservoir[*b]	84	40	68.2	2.02	
West Washington	93	42	70.6	2.75	
Florida.					
Apalachicola	94	71	81.0	6.56	
Archer	97	67	80.7	5.40	
Avon Park	93	71	81.3	5.66	
Bartow	95	69	81.4	6.03	
Bonifay	97	65	80.1	3.24	
Brooksville	95	68	81.2	8.13	
Carrabelle	92	67	80.4	3.58	
Caxambas	95	71	83.1	10.48	
Clermont	99	71	82.2	15.61	
De Funiak	96	63	78.6	3.09	
Eustis	94	67	81.0	5.34	
Federal Point	94	67	79.9	5.40	
Fort Meade	98	68	81.8	13.17	
Fort Myers	92	70	81.1	9.09	
Fort Pierce	90	70	80.7	5.61	
Gainesville	94	69	80.6	5.99	
Grasmere	92	71	80.8		
Huntington	95	67	80.5	9.05	
Hypoluxo	90	71	81.1	8.02	
Inverness	93	69	80.2	9.48	
Jasper	95	67	79.1	6.26	
Johnstown	97	66	80.7	5.95	
Kissimmee	92	69	80.0	5.04	
Lake City	98	68	80.1	5.64	
Macclenny	100	60	80.4	6.54	
Madison	99	69	81.5	3.88	
Malabar	93	70	80.8	17.73	
Manatee	95	70	81.4	9.12	
Marianna	99	62	80.2	4.45	
Merritt Island	89	72	80.6	13.57	
Miami	92	71	82.1	11.99	
Middleburg	98	63	78.6	6.44	
Molino	103	58	79.9	5.77	
Mount Pleasant	95	64	79.4	6.42	
New Smyrna	96	68	80.4	12.15	
Nocatee	96	71	81.8	4.25	
Ocala	97	66	80.4	7.80	
Orange City	99	64	81.0	10.92	
Orange Home	98	70	81.4	6.19	
Orlando	94	68	80.0	13.11	
Plant City	97	69	80.4	8.54	
Rockwell	97[e]	68[e]	81.8[e]	5.68	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Florida—Cont'd.	°	°	°	*Ins.*	*Ins.*
St. Andrews	93	68	79.9	2.58	
St. Augustine	94	71	81.2	7.79	
St. Leo	93	68	80.4	7.15	
Sand Key	94	72	83.2	4.13	
Stephensville	98	66	81.0	7.81	
Sumner	96	66	80.5	4.97	
Tallahassee	90	68	78.4	3.74	
Tarpon Springs	94	67	80.5	6.24	
Titusville	95	68	80.2	13.45	
Wausau		50		3.48	
Georgia.					
Abbeville				3.74	
Adairsville	89	56	73.8	1.41	
Albany	99	65	81.2	4.77	
Allapaha	99	64	79.2	4.35	
Americus	95	64	77.6	2.81	
Athens	88	57	73.6	0.54	
Bainbridge	98	63	80.8	6.03	
Blakely	101	65	79.8	2.42	
Bowersville	95	60	75.6	1.85	
Butler				5.03	
Camak	96	60	76.8	1.94	
Canton				1.52	
Carlton				0.85	
Carrollton	94	52	74.7	0.90	
Clayton	88	52	69.6	1.70	
Columbus	100	64	80.0	2.53	
Cordele	98	61	77.8	4.35	
Dahlonega	92	51	72.4	2.01	
Dawson	101[e]	62[e]	81.2[e]	4.02	
Diamond	88	54	71.0	5.50	
Dublin				2.79	
Dudley	101	61	79.8	2.67	
Eastman	101	64	80.3	2.96	
Eatonton	98	59	77.8	1.86	
Elberton	96	56	76.1	1.03	
Experiment	93	59	76.5	4.54	
Fitzgerald	99	63	79.0	3.39	
Fleming	99	62	78.6	4.99	
Forsyth	99	56	77.6	3.05	
Fort Gaines	93	63	78.6	2.45	
Gainesville	90	53	72.8	1.43	
Gillsville	96	55	75.2	1.37	
Glenville	97	65	78.4	3.28	
Greenbush	89	56	72.9	1.82	
Greensboro	98	56	77.3	0.76	
Griffin	94[i]	60	76.9[d]		
Harrison	96	61	76.8	2.09	
Hawkinsville	102	61	80.0	1.95	
Lost Mountain	91	55	74.4	4.01	
Louisville	96	58	77.3	0.54	
Lumpkin	101[i]	62[i]	78.2[i]	2.73	
Marshallville	95	64	78.6	7.19	
Mauzy	96	65	79.0	5.17	
Milledgevil.e	94	61	77.8	2.81	
Millen	100	62	78.2	1.62	
Montezuma				3.24	
Monticello	97	59	77.8	2.30	
Morgan	95[d]	63[d]	79.0[d]	5.66	
Newnan	95	56	76.0	1.35	
Oakdale				2.32	
Point Peter	98	53	75.6	1.31	
Poulan	96	63	79.2	3.51	
Putnam	100	60	78.6	5.24	
Quitman	94	65	78.6	8.41	
Ramsey	91	51	73.2	1.23	
Resaca				0.69	
Rome	92	53	73.6	1.88	
Screven	98	61[f]	78.1[e]	3.44	
Statesboro	98	63	80.0	1.13	
Talbotton	97	58	77.0	3.33	
Tallapoosa	94	53	74.4	1.66	
Thomasville	95	66	78.8	5.51	
Toccoa	89	55	72.4	0.56	
Valdosta	97	64	79.4	5.66	
Valona	93	65	78.4	9.14	
Vidalia	98	64	80.6	4.47	
Washington	92	60	75.8	1.24	
Waverly	98	66	79.6	8.91	
Waycross	99	66	79.2	3.08	
Waynesboro	95	63	77.3	0.08	
Westpoint	99	57	76.9	3.05	
Woodbury	95	54	74.9	2.70	
Idaho.					
Albion	89[e]	26[e]	56.8[e]	0.56	
American Falls				0.74	
Blackfoot	92	27	59.0	0.58	
Burnside	98	30	61.0	0.39	
Caldwell	92	32	61.9	0.19	
Cambridge	96	29	62.1	0.38	
Chesterfield	88	16	53.0	1.84	T.
Collins				4.38	
Ellerslie	96	33	64.4	0.13	
Fernwood	90	41	61.2	4.33	
Forney	86	16	52.8	0.51	
Franklin				2.33	
Garnet	100	39	70.6	0.21	
Glens Ferry	107	30	64.8	0.00	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Idaho—Cont'd.	°	°	°	*Ins.*	*Ins.*
Grangeville	89	32	58.8	1.82	
Hailey	88	23	58.0	0.11	
Hope	.....	.....	.....	2.25	
Idaho City	90	25	57.0	T.	
Idaho Falls	89	27	59.4	0.70	
Kellogg	93	29	56.2	2.03	
Lakeview	78	36	55.9	1.27	
Landore	83	25	53.2	0.98	1.0
Lardo	.....	.....	.....	0.40	
Lemhi Agency	88	23	56.6	0.83	
Lost River	85	25	56.4	0.05	
Lovell	90[d]	29[d]	54.6[d]	1.92	
Malad	85	24	56.0	0.70	
Meadows	92	21	55.2	0.87	
Milner	94	33	62.4	T.	
Minidoka	95	29	63.4	0.34	
Mink Creek	80	31	58.2	2.50	
Moscow	91	35	61.8	2.74	
Murray	87	21	51.6	2.79	
Nevins Ranch	.....	.....	.....	0.30	
Oakley	92	29	61.3	0.40	
Ola	93	33	61.8	0.54	
Orofino	96	33	61.1	3.40	
Paris	84	25	54.4	1.72	
Payette	100	33	62.2	0.14	
Pearl	.....	.....	.....	0.56	
Pollock	93	36	63.4	1.20	
Poplar	.....	.....	.....	0.11	
Porthill	81	32	56.1	1.01	
Priest River	84	34	56.4	1.24	
Roosevelt	76	21	50.8	0.34	2.0
St. Maries	93	35	57.8	2.37	
Salem	.....	.....	.....	0.95	
Standrod	.....	.....	.....	1.74	0.8
Vernon	90	16	56.8	0.95	T.
Westlake	.....	.....	.....	1.18	
Weston	90	29	59.6	1.60	
Illinois.					
Albion	95	47	71.2	2.37	
Aledo	95	45	68.6	1.70	
Alexander	93	46	68.4	3.98	
Antioch	90	40	64.0	2.80	
Ashton	88	41	65.0	0.70	
Astoria	89	46	65.8	3.82	
Aurora	86	41	64.8	2.36	
Benton	94	48	73.6	1.90	
Bloomington	97	46	69.8	3.59	
Bushnell	94	47	69.0	5.99	
Cambridge	95	48	68.4	1.87	
Carlinville	95	47	69.0	3.88	
Carlyle	.....	.....	.....	5.94	
Carrollton	91	41	68.5	6.02	
Charleston	96	47	69.6	2.31	
Chester	91	58	72.7	9.28	
Cisne	97	45	71.4	2.31	
Coatsburg	93	48	67.7	5.88	
Cobden	91	50	72.2	2.94	
Colchester	91	46	67.7	2.49	
Decatur	94	45	68.4	3.05	
Dixon	93	43	66.5	1.23	
Equality	94	45	73.0	1.88	
Flora	90[e]	42[e]	67.9[e]	2.35	
Friendgrove	88	48	69.6	1.44	
Galva	93	46	66.8	1.47	
Grafton	.....	.....	.....	4.46	
Greenville	94	48	69.8	3.47	
Griggsville	96	51	69.8	5.25	
Havana	95	46	69.1	4.68	
Henry	91	44	68.3	1.86	
Hillsboro	96	48	69.3	3.16	
Hoopeston	86	46	67.2	5.09	
Joliet	86	47	66.7	3.63	
Kishwaukee	92	41	66.6	1.95	
Knoxville	90	46	66.4	2.08	
Lagrange	88	47	66.0	4.25	
Laharpe	92	45	68.2	1.65	
Lanark	90	40	65.0	2.62	
Loami	.....	.....	.....	2.27	
McLeansboro	93	48	70.5	3.03	
Martinton	95	43	68.2	2.77	
Mascoutah	93	47	68.0	6.66	
Mattoon	91	54	71.7	1.29	
Minonk	94	45	67.8	2.64	
Monmouth	96	44	68.0	1.19	
Morrison	90	43	66.3	2.81	
Morrisonville	94	46	69.1	2.56	
Mount Carmel	.....	.....	.....	1.26	
Mount Pulaski	95	42	69.5	3.33	
Mount Vernon	96	45	71.0	4.24	
New Burnside	95	47	71.4	2.96	
Olney	94	46	69.2	2.07	
Ottawa	91	44	67.3	2.13	
Palestine	93	44	70.2	2.44	
Pana	95	47	69.4	2.32	
Paris	94	47	68.6	4.36	
Peoria	91	49	69.0	1.65	
Philo	96	42	67.0	4.79	
Plumhill	90	45	69.4	4.73	
Illinois—Cont'd.					
Pontiac	92	47	68.5	2.26	
Rantoul	93	45	67.0	3.75	
Raum	97	49	72.5	3.44	
Riley	90	43	65.8	2.38	
Robinson	90	45	69.0	3.68	
Rockford	88	45	67.6	1.16	
Rushville	91	39	68.6	5.39	
St. Charles	90	41	65.2	3.23	
St. John	93	47	70.5	3.89	
Shobonier	94	45	70.2	2.55	
Streator	91	43	66.6	2.39	
Sullivan	96	46	69.3	1.23	
Sycamore	91	42	65.7	1.06	
Tilden	91	46	69.8	5.19	
Tiskilwa	87	46	66.4	2.51	
Tuscola	91	45	66.8	2.94	
Urbana	93	46	67.4	2.88	
Walnut	91	45	67.8	2.77	
Warsaw	.....	.....	.....	4.28	
Winchester	92	47	68.3	5.23	
Windsor	95	42	65.4	1.14	
Winnebago	91	43	76.2	0.77	
Yorkville	89	42	66.2	1.77	
Zion	88	44	65.4	1.49	
Indiana.					
Anderson	85	44	66.4	4.15	
Angola	85	42	64.4	4.45	
Auburn	87	38	64.6	2.62	
Bedford	89	45	69.2	2.22	
Bloomington	86	46	67.7	2.15	
Bluffton	93	35	67.0	1.62	
Butlerville	89	42	68.6	2.62	
Cambridge City	90	38	65.3	3.13	
Columbus	96	38	69.0	0.87	
Connersville	90	39	66.6	3.01	
Crawfordsville	93	44	67.6	7.07	
Delphi	91	40	66.2	3.92	
Elkhart	90	44	66.2	2.64	
Farmersburg	95[e]	41[e]	69.2[e]	2.72	
Farmland	85	43	65.0	7.08	
Fort Wayne	87	42	65.2	2.89	
Franklin	90	40	67.2	3.20	
Greenfield	90	45	68.4	1.75	
Greensburg	90	42	68.1	3.26	
Hammond	86	46	66.4	3.79	
Hector	92	41	67.8	4.25	
Holland	93	46	72.7	8.19	
Huntington	88	42	65.5	4.05	
Jeffersonville	88	46	70.2	2.64	
Kokomo	90	42	66.0	3.70	
Lafayette	91	46	67.4	4.60	
Laporte	81	44	64.1	4.92	
Logansport	91	41	65.8	4.24	
Madison	92	45	70.0	1.66	
Marengo	89	42	68.5	4.61	
Marion	90	41	66.0	3.64	
Markle	90	39	66.2	2.50	
Mauzy	90	41	66.4	2.90	
Moores Hill	89	42	67.6	1.35	
Mount Vernon	93	49	72.8	3.22	
Northfield	87	39	64.7	8.16	
Paoli	90	43	69.2	6.80	
Princeton	93	51	72.8	2.00	
Rensselaer	91	40	66.5	3.69	
Richmond	89	38	66.0	3.85	
Rochester	91[f]	42[f]	67.2[f]	4.24	
Rockville	88	46	67.8	4.01	
Rome	98	43	70.6	3.48	
Salem	94	40	70.0	4.35	
Scottsburg	89	43	69.0	1.53	
Seymour	88	42	69.4	1.43	
Shelbyville	88	41	67.2	3.75	
South Bend	89	41	66.1	3.93	
Syracuse	93	41	66.0	3.88	
Terre Haute	90	50	70.4	3.52	
Valparaiso	89	43	67.6	3.78	
Veedersburg	.....	.....	.....	2.85	
Vevay	88	45	69.3	2.10	
Vincennes	94	46	71.3	1.60	
Washington	92	47	70.0	1.70	
Winamac	88	40	66.6	3.76	
Indian Territory.					
Ardmore	101	50	78.4	0.58	
Calvin	.....	.....	.....	4.78	
Durant	97	50	76.8	0.23	
Fairland	94	48	73.6	3.79	
Fort Gibson	.....	.....	.....	7.01	
Goodwater	100	51	78.5	0.88	
Hartshorne	.....	.....	.....	3.56	
Healdton	103	43	76.2	1.95	
Holdenville	96	45	73.7	5.00	
Marlow	101	51	76.1	2.14	
Muskogee	97	51	74.3	4.94	
Okmulgee	94	48	73.8	5.16	
Pauls Valley	95	45	74.2	4.75	
Ravia	99	50	78.0	2.75	
South McAlester	96	53	77.4	1.54	
Tahlequah	.....	.....	.....	6.04	
Indian Territory—Cont'd.					
Vinita	94	47	73.8	3.15	
Wagoner	95	51	74.2	3.65	
Webbers Falls	97	50	75.0	6.07	
Iowa.					
Afton	88	47	66.6	5.27	
Albia	90	47	66.4	4.92	
Algona	84	42	64.0	1.61	
Allerton	93	48	67.8	4.67	
Alta	84	44	64.1	7.66	
Alton	85	42	64.6	5.20	
Amana	90	45	66.4	1.84	
Ames	88	43	65.7	2.96	
Atlantic	89	40	66.3	9.23	
Audubon	87	41	65.5	4.50	
Baxter	86	44	66.5	2.81	
Bedford	93	45	67.8	5.73	
Belleplaine	88	43	65.2	3.05	
Bonaparte	93	47	68.2	2.05	
Boone	87	47	65.2	2.91	
Britt	85	40	63.5	1.49	
Buckingham	.....	.....	.....	3.37	
Burlington	93	48	68.9	2.90	
Carroll	85	42	64.2	2.51	
Cedar Rapids	92	46	66.6	1.50	
Chariton	91	47	66.3	3.67	
Clarinda	94	45	67.4	6.14	
Clearlake	82	47	62.8	0.50	
Clinton	91	41	65.8	3.81	
Columbus Junction	91	48	68.1	1.56	
Corning	88	45	65.1	7.89	
Corydon	92	49	68.0	3.04	
Cresco	82	43	63.3	1.45	
Creston	86	48	66.0	6.37	
Cumberland	.....	.....	.....	8.22	
Decorah	83	42	64.5	1.91	
Delaware	85	44	64.2	2.62	
Denison	89	41	66.0	2.96	
Desoto	89	46	67.4	3.03	
Dows	86	40	63.9	1.36	
Earlham	87	40	64.6	3.53	
Elkader	90	39	66.5	3.07	
Elliott	89	44	67.5	6.39	
Estherville	85	42	62.8	5.68	
Fayette	87	37	63.7	3.58	
Florence	.....	.....	.....	1.57	
Forest City	88	42	63.6	1.98	
Fort Dodge	86	44	63.8	2.54	
Fort Madison	.....	.....	.....	2.38	
Galva	84	42	64.0	4.70	
Gilman	.....	.....	.....	3.52	
Glenwood	86	45	67.5	7.50	
Grand Meadow	83	45	64.2	3.36	
Greene	86	42	64.0	1.68	
Greenfield	87	44	66.1	6.06	
Grinnell	90	45	66.2	2.07	
Grundy Center	87	42	65.6	1.54	
Guthrie Center	85	43	66.0	3.68	
Hampton	91	45	65.8	2.57	
Hancock	94	44	70.5	7.61	
Hanlontown	84	38	62.0	1.54	
Harlan	85	41	65.6	3.54	
Hopeville	93	49	67.8	5.68	
Humboldt	84	43	64.2	1.84	
Ida Grove	83	38	62.3	2.73	
Indianola	91	47	66.8	.....	
Inwood	89	39	64.7	4.42	
Iowa City	91	45	66.0	1.54	
Iowa Falls	85	40	63.4	2.81	
Jefferson	88[f]	45[f]	66.6[f]	4.40	
Keosauqua	94	46	67.2	2.20	
Knoxville	88	48	67.8	2.68	
Lacona	.....	.....	.....	3.96	
Larrabee	85	42	64.9	7.41	
Leclaire	.....	.....	.....	3.11	
Lemars	85	41	64.8	8.31	
Lenox	88	45	66.8	6.73	
Leon	88	50	67.0	4.45	
Little Sioux	88	44	68.6	4.64	
Logan	86	40	67.0	6.52	
Maple Valley	.....	.....	.....	7.29	
Maquoketa	90	39	64.6	2.82	
Marshalltown	90	42	66.0	3.34	
Mason City	85	44	64.0	1.00	
Massena	91	43	68.1	7.57	
Monticello	87	40	64.0	2.64	
Montezuma	.....	.....	.....	1.80	
Mountayr	96	46	68.4	6.92	
Mount Pleasant	93	48	67.6	2.02	
Mount Vernon	91	45	66.4	1.32	
Muscatine	.....	.....	.....	1.33	
Nevada	.....	.....	.....	2.77	
Newton	86	48	65.2	3.47	
Northwood	84	42	63.3	1.89	
Odebolt	85	44	65.1	4.69	
Ogden	88	46	66.4	2.38	
Olin	89	43	65.8	2.30	
Onawa	89	44	68.2	5.23	
Osage	85	43	63.4	1.53	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Iowa—Cont'd.	°	°	°	*Ins.*	*Ins.*
Oskaloosa	89	45	67.2	2.31	
Ottumwa	96	48	66.8	3.37	
Pacific Junction	87	39	67.0	8.13	
Pella	91	48	68.6	2.28	
Perry	86e	45e	66.2e	2.40	
Plover	85	46	63.6	.....	
Pocahontas	85	45	64.6	3.25	
Redoak	92	46	69.2	8.26	
Ridgeway	91	45	66.4	2.02	
Rock Rapids	88	38	67.8	2.73	
Rockwell City	88	43	65.3	2.70	
Sac City	84	43	64.4	2.37	
St. Charles	92	50	68.5	3.27	
Sheldon	88	42	65.7	4.36	
Sibley	86	43	62.6	4.07	
Sidney	90	49	67.9	9.64	
Sigourney	92	47	67.6	2.09	
Sioux Center	86	42	63.9	4.47	
Spirit Lake	93	44	65.2	3.15	
Stockport	90	48	65.4	2.36	
Storm Lake	85	44	63.4	3.95	
Thurman	88	44	67.4	13.18	
Tipton	92	49	68.6	2.06	
Toledo	88	42	66.1	4.00	
Vinton	89	42	65.8	2.08	
Washington	90	46	66.6	1.87	
Washta	89	36	65.2	5.51	
Waterloo	89	42	65.4	2.99	
Waukee	90	48	67.0	3.59	
Waverly	87	42	64.2	1.73	
Webster City	87	40	65.2	2.04	
Westbend	83	43	63.4	2.65	
Whitten	85	41	65.4	.....	
Wilton Junction	94	45	66.9	4.60	
Winterset	86	46	66.8	3.56	
Woodburn	88	42	65.8	4.37	
Zearing	88	41	65.2	1.81	
Kansas.					
Abilene	.....	.....	.....	3.07	
Alton	98	40	71.8	1.19	
Anthony	.....	.....	.....	4.62	
Atchison	91	47	69.6	8.37	
Baker	95	46	68.8	9.05	
Burlington	99	43	71.2	10.34	
Chapman	93	45	71.1	3.00	
Clay Center	96	40	71.2	2.57	
Colby	94	35	67.9	1.59	
Columbus	91	45	71.6	6.52	
Cottonwood Falls	100	42	72.5	7.53	
Cunningham	102	45	75.9	3.40	
Dresden	96	39	70.2	1.09	
Eldorado	101	45	72.2	8.18	
Ellinwood	94	43	71.9	2.44	
Ellsworth	96	41	72.0	2.39	
Emporia	97	47	71.0	7.97	
Englewood	.....	.....	.....	2.48	
Enterprise	93	43	71.2	3.03	
Eureka	.....	.....	.....	8.35	
Fall River	103	45	72.6	4.00	
Farnsworth	96	36	71.4	0.46	
Forsha	103	43	72.6	7.95	
Fort Leavenworth	93	51	71.2	9.13	
Frankfort	95	37	67.6	6.80	
Garden City	97	44	72.1	1.05	
Gove*1	93	42	70.8	4.14	
Grenola	103	44	70.6	5.86	
Harrison	93	39	68.6	2.66	
Horton	96	45	69.4	8.81	
Hoxie	95	36	70.2	1.33	
Hugoton	100	38	72.0	1.40	
Hutchinson	98	43	72.2	7.57	
Independence	107	49	74.4	7.91	
Iola	97	49	71.6	8.32	
La Crosse	96d	37d	72.0d	1.65	
Lakin	94	36	68.8	1.92	
Larned	96	41	70.6	2.98	
Lebo	95	48	71.2	11.36	
Macksville	97	42	70.4	3.29	
McPherson	97	44	71.8	6.33	
Madison	100	42	71.1	11.76	
Manhattan b	95	42	72.1	4.32	
Manhattan c	97	40	70.4	4.12	
Marion	.....	.....	.....	7.75	
Medicine Lodge	99	44	72.3	4.89	
Minneapolis	93	44	71.5	2.87	
Moran	100	45	72.2	7.19	
Neosho Rapids	.....	.....	.....	8.90	
Ness City	.....	.....	.....	0.38	
Newton	101	43	73.2	6.43	
Norton	94	40	69.8	1.90	
Norwich	104	45	73.0	4.90	
Oberlin	.....	.....	.....	2.65	
Osage City	95	44	70.9	8.50	
Osborne	.....	.....	.....	1.95	
Oswego	94	46	72.7	7.55	
Ottawa	96	43	70.2	10.43	
Plainville	.....	.....	.....	1.45	
Pleasanton	95	46	70.8	6.39	
Pratt	94	46	72.6	3.64	
Republic	95	40	69.2	2.95	
Rome	105	44	74.6	2.72	
Russell	96	42	70.9	1.59	
Salina	94	39	72.2	2.86	
Sedan	105	50	73.0	5.81	
Toronto	106	44	71.0	7.52	
Ulysses	99	40	73.2	1.98	
Valley Falls	96	43f	69.6e	10.17	
Viroqua	100	40	70.8	1.49	
Wakeeney	95	42	71.6	2.02	
Wakeeney (near)	.....	.....	.....	1.47	
Wallace	93	38	69.2	5.11	
Walnut	95	49	72.6	8.38	
Wamego*1	90	49	69.5	5.71	
Winfield	101	45	72.2	3.90	
Yates Center	102	46	72.8	8.32	
Kentucky.					
Alpha	88	49	70.1	1.95	
Anchorage	91	42	68.1	3.33	
Bardstown	93	45	71.0	2.30	
Beattyville	92	44	69.8	2.11	
Beaver Dam	94	41	70.2	1.92	
Berea	90	44	69.6	2.06	
Blandville	88	52	72.1	1.06	
Bowling Green	92	51	72.8	3.00	
Burnside	98	46	72.6	2.18	
Cadiz	93	47	72.8	3.39	
Calhoun	94	46	72.7	2.90	
Catlettsburg	92	42	70.0	0.52	
Earlington	90	45	70.8	1.96	
Edmonton	88	46	70.2	4.45	
Eubank	89	46	68.0	4.84	
Falmouth	.....	.....	.....	0.82	
Farmers	89	36	67.6	1.52	
Frankfort	87	44	68.5	2.04	
Greensburg	92	44	69.3	6.13	
High Bridge	92	48	71.5	2.02	
Hopkinsville	91	46	70.7	3.03	
Irvington	90	46	70.7	2.06	
Jackson	91	47	71.0	2.02	
Leitchfield	89	47	69.6	3.90	
Loretto	95	40	71.0	1.63	
Manchester	90	45	71.4	5.01	
Marion	92	52	75.3	1.15	
Maysville	94	43	69.0	2.22	
Middlesboro	91	47	70.7	4.25	
Mount Sterling	87	42	68.3	2.96	
Owensboro	94	40	72.6	2.39	
Paducah	93	53	74.0	1.66	
Richmond	90	45	70.0	3.67	
St. John	89	45	68.6	1.90	
Scott	92	42	68.6	0.85	
Shelby City	93	43	68.8	2.38	
Shelbyville	92	40	68.5	3.22	
Taylorsville	88	42	68.3	4.81	
Williamsburg	90	49	71.0	2.74	
Williamstown	88	45	67.6	1.92	
Louisiana.					
Abbeville	96	59	79.4	6.55	
Alexandria	102	58	67.1	1.91	
Amite	96	62	78.8	6.60	
Baton Rouge	100	60	80.4	4.75	
Burnside	95	58	78.7	6.76	
Calhoun	95	55	75.9	4.15	
Cameron	92	63	80.6	3.61	
Caspania	99	51	78.2	3.61	
Cheneyville	97	58	79.6	2.78	
Clinton	93	60	77.8	9.55	
Collinston	98	56	77.4	3.60	
Covington	94	57	78.4	5.13	
Donaldsonville	100	62	82.1	6.63	
Farmerville	94	54	78.0	2.98	
Franklin	98	64	81.2	8.88	
Georgetown	97	55	77.5	7.30	
Grand Coteau	95	60	79.5	10.48	
Hammond	93	58	78.6	5.58	
Houma	97	62	81.9	7.13	
Jennings	95	60	79.7	2.60	
Lafayette	96	59	79.2	5.03	
Lake Charles	97	60	77.2	8.80	
Lakeside	96	63	80.2	1.54	
Lawrence	96	70	82.2	5.60	
Libertyhill	100	57	77.6	4.46	
Logansport	.....	.....	.....	3.50	
Mansfield	95	55j	77.3e	0.30	
Melville	98	57	79.2	5.50	
Minden	97	50	75.0	1.41	
Monroe	98	59	77.9	4.18	
Morgan City	.....	.....	.....	7.40	
New Iberia	91	63	79.1	8.45	
Opelousas	98	59	79.8	7.09	
Plain Dealing	97	54	77.5	1.35	
Port Eads	91	71	82.4	5.84	
Rayne	96	61	80.0	5.04	
Reserve	98	62	79.7	7.83	
Robeline	96	52	76.4	1.79	
Ruston	98	53	78.0	5.75	
Schriever	99	59	80.2	6.92	
Simmesport	.....	.....	.....	3.46	
Sugar Experiment Station	93	64	79.6	8.94	
Sugartown	94	61	79.0	3.41	
Venice	97	68	80.6	12.74	
Maine.					
Chesuncook	72	23	48.3	1.18	1.0
Cornish	83	32	57.4	7.46	
Danforth	.....	.....	.....	3.75	
Debsconeag	83	30	56.0	2.92	T.
Fairfield	82	30	57.5	2.45	
Farmington	81	28	56.4	5.27	
Gardiner	82	31	58.4	4.09	
Grant Farm	.....	.....	.....	1.83	
Greenville	.....	.....	.....	2.82	T.
Lewiston	82	35	58.4	5.51	
Madison	79	34	56.6	5.61	
Mayfield	75	27	54.6	4.40	T.
Millinocket	82	28	55.8	3.47	
North Bridgton	84	34	58.4	7.02	
Oquossoc	74	28	54.4	2.95	
Orono	83	29	57.6	3.19	
Patten	83	23	55.0	3.96	T.
Rumford Falls	80	32	57.2	4.21	
The Forks	.....	.....	.....	3.47	0.8
Thomaston	77	28	56.1	5.82	
Vanburen	84	22	54.6	2.20	T.
Winslow	86	26	58.4	3.20	
Maryland.					
Annapolis	87	43	68.8	2.31	
Bachmans Valley	.....	.....	.....	4.94	
Boettcherville	94	34	67.4	1.87	
Cambridge	92	41	70.8	3.58	
Cheltenham	88	40	67.4	3.06	
Chestertown	84	43	67.2	2.59	
Chewsville	87	32	65.0	1.37	
Clearspring	85	40	64.8	2.60	
Coleman	89	41	69.0	3.06	
Collegepark	89	34	67.2	2.25	
Colora	.....	.....	.....	2.53	
Cumberland	.....	.....	.....	2.39	
Darlington	92e	37e	66.3e	2.55	
Deerpark	85e	24e	59.2e	1.43	
Denton	90e	38e	68.0e	2.76	
Easton	86	42	67.6	3.63	
Fallston	87	39	64.2	3.27	
Frederick	91	36	67.9	2.13	
Grantsville	84	30	60.2	2.37	
Greatfalls	90	37	67.2	1.77	
Greenspring Furnace	88	34	66.2	2.08	
Harney	.....	.....	.....	2.82	
Jewell	87	43	68.4	3.46	
Johns Hopkins Hospital	88	45	70.4	2.16	
Keedysville	92	35	67.4	2.34	
Laurel	89	38	68.8	2.67	
McDonogh	.....	.....	.....	2.63	
New Market	86	38	66.6	2.60	
Oakland	82	26	60.2	2.44	
Pocomoke City	89	43	67.2	3.45	
Porto Bello	91	43	70.4	2.52	
Princess Anne	89	39	67.7	4.55	
Solomons	88	51	70.9	3.08	
Sudlersville	93	39	69.2	3.88	
Takoma Park	87	40	66.8	2.45	
Van Bibber	85	40	67.6	3.22	
Westernport	82	34	64.8	2.60	
Woodstock	86	37	66.4	2.26	
Massachusetts.					
Amherst	85	32	59.8	6.26	
Bedford	74	35	59.2	8.32	
Bluehill (summit)	79	36	60.2	6.31	
Cambridge	80	35	61.4	5.99	
Chestnuthill	82	33	61.9	5.93	
East Templeton*1	78	38	59.9	5.87	
Fitchburg	83	36	60.4	6.10	
Framingham	80	30	59.6	7.16	
Groton	77	33	58.5	6.21	
Hyannis	.....	.....	.....	5.63	
Jefferson	.....	.....	.....	6.64	
Lawrence	80	34	60.4	6.61	
Leominster	.....	.....	.....	6.50	
Lowell	81	35	62.0	6.39	
Ludlow Center	78	27	56.4	6.29	
Middleboro	80	29	59.8	5.19	
Monson	75	32	59.2	7.01	
New Bedford	75	36	61.2	6.36	
Plymouth*1	76	42	60.2	5.75	
Princeton	.....	.....	.....	6.35	
Provincetown	78	40	62.2	4.78	
Salem	.....	.....	.....	6.67	
Somerset*1	83	34	62.8	5.31	
Sterling	.....	.....	.....	6.78	
Taunton	80	30	60.4	4.79	
Webster	.....	.....	.....	6.67	
Westboro	83	30	61.5	6.97	
Weston	78	30	59.2	7.99	
Williamstown	78	35	58.2	3.24	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Massachusetts—Cont'd.	°	°	°	*Ins.*	*Ins.*
Winchendon				6.07	
Worcester	82	37	61.1	6.16	
Michigan.					
Adrian	94	36	64.9	1.90	
Agricultural College	89	39	63.8	3.21	
Allegan	96	39	65.7		
Alma	88	34	62.4	2.26	
Ann Arbor	90	32	64.6	2.51	
Arbela	86	34	64.4	2.29	
Baldwin	90	32	59.9	1.68	
Ball Mountain	89	35	62.6	3.42	
Baraga	83			3.47	
Battle Creek	89	39	65.2	2.22	
Bay City	85	40	64.0	4.60	
Benzonia	88[c]	40	68.4	1.64	
Berlin	89	33	62.6	2.86	
Big Rapids	88	32	60.6	3.34	
Birmingham	88	37	63.4	2.17	
Bloomingdale	89	40	64.2	3.65	
Cassopolis	87	42	65.3	2.70	
Charlevoix[e]	86	41	62.8		
Charlotte				2.18	
Chatham	84	29	57.2	3.73	
Cheboygan	83	28	60.0	1.23	
Clinton	90	38	64.6	2.99	
Coldwater	90	39	65.1	4.00	
Concord	85	39	63.0	3.58	
Deer Park	85	36	57.6	3.45	
Detour	75	44	60.4	2.36	
Dundee	89	36	64.6	1.75	
Eagle Harbor	89[b]	31	58.6[d]	4.57	
East Tawas	81[d]	35[d]	60.9[e]	2.74	
Eloise	90	36	63.9	2.42	
Fennville	82	40	63.0	3.19	
Fitchburg	88	34	62.6	4.14	
Flint	88	33	62.4	3.13	
Gaylord	88	42	64.3		
Gladwin	93	29	62.5	5.75	
Grand Haven	84	41	63.4	3.04	
Grand Marais	75	40	60.4	0.76	
Grape	89	35	64.1	2.82	
Grayling	87	30	58.4	1.75	
Hagar	85	39	63.6	4.75	
Harbor Beach	87	43	63.6	1.63	
Harrisville	87	37	62.6	1.38	
Hastings	89	37	64.0	2.93	
Hayes	85	34	61.8	1.56	
Highland				3.99	
Hillsdale	88	38	64.0	3.99	
Holland	79	40	60.2	3.62	
Howell	87	38	64.0	5.13	
Humboldt	80	25	55.3	2.75	
Iron Mountain	88	33	59.3	4.31	
Iron River	82	26	56.8	5.65	
Ironwood	84	30	59.7	5.09	
Ishpeming	83	30	56.4	3.29	
Ivan	88	35	61.6	2.62	
Jackson	92	40	66.2	3.61	
Jeddo	87	37	63.2	2.50	
Lake City	84	40	58.2	2.00	
Lansing	87	40	64.4	4.14	
Lapeer	85	30	65.0		
Ludington	85	42	62.7	2.10	
Mackinac Island	80	42	61.4	8.20	
Mackinaw City	81			3.03	
Mancelona	90	24	57.2	1.39	
Manistee	79				
Marine City	87	35	62.4	2.63	
Menominee	80	40	62.0	2.33	
Montague	88	40	63.6	3.88	
Mount Pleasant				2.16	
Muskegon	90	40	64.3	4.23	
Newberry				1.30	
Old Mission	87[c]	42[c]	63.6[e]	1.17	
Olivet	84	40	63.5	3.03	
Omer	90			2.06	
Onaway	80	30	58.2	1.10	
Ovid	87	35	63.2	3.41	
Owosso	88[c]	35[c]	62.9[e]	2.79	
Petoskey	89	36	62.5	2.42	
Plymouth	92	29	62.7		
Pontiac	90	34	63.9	2.62	
Port Austin	86	34	64.0		
Powers	87	32	60.6		
Reed City	89	34	62.2	2.43	
Saginaw (W. S.)	89	37	64.1	4.85	
St. James	80	44	62.3	2.85	
St. Johns	90	35	64.0	2.27	
St. Joseph	84	45	64.8	3.89	
Slocum	87	36	62.0	3.97	
Somerset	88	38	62.8	3.83	
South Haven	90	31	62.8	2.48	
Stanton	87	36	62.0	2.61	
Thomaston	85	20	55.5	5.48	
Thornville	86	38	64.5	3.11	
Traverse City	88	43	61.4	1.90	
Vassar	90	32	64.4	3.61	
Wasepi	86	38	63.0	3.18	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Michigan—Cont'd.	°	°	°	*Ins.*	*Ins.*
Webberville	88	36	62.3	5.59	
Wetmore	84	23[i]	56.0[f]	5.85	
Whitefish Point	77	34	57.8	6.07	
Ypsilanti	84	32	62.4	2.81	
Minnesota.					
Albert Lea	87	43	64.4	2.11	
Alexandria	88	42	62.3	2.82	
Amboy	88	42	64.8	5.08	
Angus	86[c]	35[c]	60.7[e]	1.32	
Ashby	85	43	62.5	1.25	
Beardsley				1.80	
Beaulieu[d]	85	34	62.0		
Bemidji	87	34	60.9	2.39	
Bird Island	86	43	64.4	2.86	
Caledonia	80	40	61.7	2.10	
Campbell	88	40	60.6	2.30	
Collegeville	86	40	62.6	2.84	
Crookston	85	39	60.3	2.27	
Detroit	85	34	59.3	3.54	
Faribault	83	39	62.5	2.23	
Farmington	83	41	63.0	3.03	
Fergus Falls	87	43	63.3	3.97	
Glencoe	86	33	59.3	4.94	
Grand Meadow	85	43	62.8	2.05	
Hallock	87	28	59.8	2.88	
Halstad	88	35	62.4	2.51	
Hinckley	82	34	60.6	5.50	
Hovland	76	35	55.1	8.19	
Lake Winnibigoshish	83	34	58.6	4.60	
Leech	84	28	58.8	4.36	
Little Falls				3.70	
Long Prairie	92	38	62.2	3.26	
Luverne	85	42	61.5	3.56	
Lynd	88	39	62.2	3.14	
Mankato				5.31	
Mapleplain	86	40	63.6	5.32	
Milaca	85	31	60.2	3.57	
Milan	90	43	62.8	2.07	
Montevideo	89	44	64.3	3.94	
Mora	84	36	60.8	3.65	
Morris	87	40	60.9	2.70	
Mount Iron	84	29	57.4	7.61	
New London	90	44	62.4	1.87	
New Richland	86	43	64.6	2.12	
New Ulm	89	45	65.0	3.45	
Park Rapids	84	37	58.2	2.71	
Peterson				2.17	
Pine River	85	34	57.8	2.96	
Pipestone	85	42	63.2	1.31	
Pokegama Falls	84	29	59.2	4.00	
Pratt	85	42	63.0	3.08	
Redwing	84	42	64.2	1.41	
Reeds				2.66	
Rolling Green	82	45	63.6	6.90	
St. Charles	83	42	63.2	1.41	
St. Cloud	89	39	63.2	3.38	
St. Peter	87	41	65.1	4.47	
Sandy Lake Dam	83	37	60.4	3.24	
Shakopee	84	42	63.8	4.47	
Stillwater				5.36	
Thief River Fall	84	36	60.1	2.71	
Tonka				5.82	
Wabasha	90	40	65.4	2.22	
Wadena	85	36	59.9	3.38	
Willow River	84	39	59.4	4.23	
Windom	86	42	61.4	2.72	
Winnebago	88	43	64.8	3.73	
Winona	82	44	62.3	1.77	
Worthington	88	40	62.7	3.31	
Zumbrota	80	38	61.9	1.30	
Mississippi.					
Aberdeen	95	54	75.0	3.13	
Agricultural College	92	59	76.6	1.78	
Austin	94	51	74.4	2.79	
Batesville	92	50	74.9	3.38	
Bay St. Louis	100	60	80.8	5.33	
Biloxi	98	66	82.5	7.05	
Booneville	89	53	74.0	2.76	
Brookhaven	100	59	79.2	3.58	
Canton	98	54	77.0	1.81	
Columbia				2.56	
Columbus	96	58	76.2	2.06	
Corinth	86	52	72.4	3.27	
Crystal Springs	98	57	77.4	3.49	
Duck Hill	95	50	75.9	1.47	
Edwards	95	53	76.0	2.83	
Enterprise				1.36	
Fayette	92	56	75.6	8.00	
Fayette (near)				7.94	
Greenville *a*	94	57	76.6	2.52	
Greenville *b*	97	59	78.2	2.44	
Greenwood	95	55	76.2	3.17	
Hattiesburg				4.25	
Hazlehurst	96	57	77.4	3.23	
Hernando	95	54	76.4	1.42	
Holly Springs	92	59	75.2	4.68	
Indianola	90	55	74.6	2.95	
Jackson	94	57	76.8	2.21	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Mississippi—Cont'd.	°	°	°	*Ins.*	*Ins.*
Kosciusko	98	52	77.0	1.23	
Lake	96	51	75.8	1.32	
Lake Como	100	53	78.7	2.67	
Leakesville	99	59	79.6	3.72	
Leland				2.44	
Louisville	96	55	76.4	1.69	
Macon	93	55	77.0	1.60	
McNeill	93	59	78.0	3.34	
Magnolia	101	59	79.9	5.83	
Merrill				1.31	
Natchez	95	65	80.9	8.55	
Nitta Yuma	97	56	75.5	4.30	
Okolona	96	61	79.3	1.36	
Patmos				1.80	
Pearlington	98	59	79.8	8.34	
Pecan	98	63	80.0	6.71	
Pittsboro	98	51	75.4	1.10	
Pontotoc	90	51	73.8	2.38	
Port Gibson	98	55	76.5	5.75	
Porterville	95	54	76.0	1.45	
Quitman	95	51	77.8	9.50	
Ripley	90	46	72.0	7.10	
Shelby	97	50[c]	76.3[e]	3.34	
Shoccoe	99	53	77.8	0.79	
Shubuta				1.68	
Stonington				8.60	
Suffolk	96	58	78.1	9.77	
Tchula	98	54	77.2	1.10	
Tupelo	94	51	75.9	1.64	
University	93	56	76.3	1.54	
Utica	94	54	74.0	6.37	
Walnutgrove	92[d]	53[d]	75.7[e]	1.46	
Walthall				3.99	
Watervalley	95	50	76.4	2.20	
Waynesboro	95	54	75.8	1.38	
Woodville	96	60	78.4	8.03	
Yazoo City	96	55	78.0	1.07	
Missouri.					
Albany				8.71	
Appleton City	93	49	71.0	4.50	
Arthur	94	45	70.7	4.44	
Avalon	94	48	69.1	13.91	
Bethany	90	47	67.4	6.37	
Birchtree	87[b]	51[b]	71.2[b]	4.29	
Blue Springs	91[c]	44[c]	69.0[e]	12.36	
Boonville				16.11	
Bourbon	93	46	69.5	7.93	
Brunswick	92	50	68.3	11.64	
Caruthersville	93	48	73.6	1.88	
Conception	94	49	68.8	8.79	
Darksville	95	49	70.2	7.28	
Dean	94	46	72.4	4.92	
De Soto	96	52	70.4	4.14	
Doniphan	88[b]	49	71.0[d]	3.86	
Downing				4.84	
Eldorado Springs	94	48	71.2	4.76	
Fairport				7.30	
Fayette	91	46	66.6	12.01	
Fulton	97	43	69.6	10.28	
Gallatin[e][i]	94	54	70.2	8.60	
Gano	93	44	69.9	7.21	
Glasgow	93[i]	49[i]	68.0[i]	12.98	
Goodland	88	45	68.1	8.20	
Gorin				4.75	
Grant City	93	48	58.1	6.66	
Harrisonville	96	47	69.8	11.94	
Hazlehurst				11.06	
Hermann				7.82	
Houston				5.64	
Ironton	92	44	69.4	8.62	
Jackson	90	47	70.9	4.17	
Jefferson City	94	45	69.2	11.73	
Kidder	92	49	68.0	7.20	
Koshkonong	86	51	70.9	5.15	
Lamar	94	47	70.7	7.60	
Lamonte				14.04	
Lebanon	90	49	69.4	5.95	
Lexington	91	51	70.3	10.52	
Liberty	91	51	69.6	9.70	
Lockwood	90	46	69.7	9.48	
Louisiana	96	44	68.2	6.59	
Macon	95	49	69.7	6.67	
Marblehill	90	48	70.8	5.54	
Marshall	91	48	68.8	16.34	
Maryville	90	48	67.3	7.19	
Mexico	95	46	68.8	10.73	
Monroe	92	47	67.8	7.03	
Montreal	94	46	69.6	8.55	
Mountaingrove	85	46	69.4	4.83	
Mount Vernon	97	43	71.0	6.76	
Neosho	92	43	71.6	3.52	
New Haven	95	50	71.0	8.95	
New Madrid				1.25	
New Palestine	93	49	70.4	16.17	
Oakfield	93	49	70.5	10.81	
Olden	88	45	70.5	4.11	
Oregon	89	48	68.0	12.04	
Osceola				4.28	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Missouri—Cont'd.	°	°	°	*Ins.*	*Ins.*
Pine Hill				8.36	
Princeton	90	50	68.4	5.67	
Protem	92	48	72.0	3.86	
Rockport				10.88	
Rolla				9.51	
St. Charles	96	49	70.4	5.80	
St. Joseph				7.84	
Sarcoxie				5.86	
Sedalia	92	48	69.8	14.02	
Seymour	88	46	69.0	6.18	
Sikeston	90	48	70.5	0.55	
Steffenville	92	50	68.2	5.58	
Sublett	94	48	68.4	7.05	
Trenton	91	51	68.8	8.59	
Unionville	96	47	67.7	6.15	
Versailles	98	46	70.4	13.64	
Vichy	93	45	69.4	8.96	
Warrensburg	94	49	71.3	10.84	
Warrenton	95	49	68.6	6.48	
Warsaw	93	44	69.1	6.73	
Wheatland				7.36	
Willowsprings	87	41	68.3	4.73	
Windsor	94	46	70.8	8.08	
Zeitonia	88	46	71.2	6.16	
Montana.					
Absarokee				0.65	
Adel	81	24	53.8	0.24	
Augusta	85	27	55.1	0.07	
Billings	95	33	64.0	1.54	
Boulder	85	27	56.1	T.	
Bozeman	84	28	57.2	1.48	3.0
Butte	80	27	56.4	0.45	
Canyon Ferry	91	31	59.4	0.35	
Chinook	92[c]	34[c]	61.0[c]	0.48	
Choteau	87	25	57.2	0.27	
Clearcreek	86	35	58.2	0.22	
Columbia Falls	83	24	55.4	2.04	
Copper				2.21	5.0
Crow Agency	90	35	61.7	1.07	
Culbertson	92	28	58.9	2.11	
Dayton	84	36	59.6	0.92	
Decker	94	28	61.1	1.30	
Deerlodge				0.31	
Dillon	84	26	57.7	0.26	T.
Ekalaka	93	35	63.4	1.60	
Fallon	95	37	63.4	1.05	
Forsyth	94	40	63.1	1.39	
Fort Benton	88	32	59.0	0.32	
Fort Harrison	89	31	59.5		
Fort Logan	85	30	53.5	0.95	
Glasgow	88	32	59.4	0.72	
Glendive	93	34	63.1	1.85	
Gold Butte				0.73	
Graham	95	33	61.7	1.27	T.
Grayling	81[d]	10[d]	46.4[d]	1.02	T.
Greatfalls	86	32	59.6	0.18	
Hamilton	86	32	58.2	0.43	
Highwood				0.40	
Homepark				0.98	
Lakeview				1.10	
Lame Deer	93	38	65.4	1.80	1.0
Lewistown	95	34	58.9	1.20	
Livingston	89	32	60.6	0.55	2.0
Lodge Grass				2.10	
Malta	87	38	60.4	0.37	
Marysville	79	30	54.6	0.11	
Mullets Ranch				2.63	
Musselshell				0.03	
Nye				1.44	1.1
Ovando	88	20	53.5	0.97	
Parrot	88	30	61.4	0.76	
Philipsburg	90	27	54.4	0.89	T.
Plains	87	32	58.2	1.60	
Poplar	93	31	60.8	1.67	
Raymond				T.	
Redlodge	83	26	55.8	1.15	3.0
St. Pauls	95	34	60.8	0.53	
St. Peter	85	34	57.6	0.33	
Saltese				2.84	1.0
Springbrook	91	33	61.7	2.18	
Steele	90	39	61.3	0.43	
Toston	86	29	60.6	0.65	
Townsend				0.59	
Troy	87	29	57.0	1.33	
Twin Bridges	90	23	56.8	0.20	
Utica	85	33	58.3	0.83	T.
Virginia City	83	22	57.2	0.85	2.0
Warrick				T.	
Whitlash				0.19	
Wolf Creek	89	25	58.0	0.21	
Wolf Point				0.51	
Wolsey	85	13	51.1	0.85	4.0
Yale	86	34	58.6	0.52	
Nebraska.					
Agate	91	27	59.1	0.41	T.
Albion	85[c]	35[c]	64.4[c]	4.30	
Alma	95	39	68.8	2.41	
Arapaho				3.29	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Nebraska—Cont'd.	°	°	°	*Ins.*	*Ins.*
Arcadia				4.01	
Ashland	90	43	68.5	7.46	
Ashton				5.13	
Auburn	92	42	67.6	7.33	
Aurora	93	42	67.2	5.35	
Beatrice	88	41	68.5	5.17	
Beaver	90	40	68.4	2.57	
Bellevue	89	47	68.6	8.40	
Blair	85	44	67.0	4.44	
Bluehill				3.90	
Bradshaw				8.40	
Bridgeport	96	32	62.9	1.24	
Broken Bow	90	36	64.9	3.14	
Burchard				5.67	
Burge				0.97	
Burwell				5.87	
Central City				7.08	
Chester				2.00	
Clearwater	90	34	65.4	6.42	
Cody				0.70	
Columbus	90	38	66.2	6.87	
Crete	91	43	69.0	4.49	
Culbertson	98	38	68.4	2.83	
Curtis	86	32	63.0	4.52	
David City	84	41	66.2	6.29	
Dawson	95	43	70.0	6.66	
Dubois				7.00	
Duff				3.30	
Dunning				2.35	
Edgar				2.95	
Ericson				5.70	
Ewing				4.19	
Fairbury	94	37	68.8	2.99	
Fairmont	92	41	67.0	3.54	
Fort Robinson	98	28	62.0	0.39	
Franklin	93	37	68.4	2.46	
Fremont	91	41	68.0	7.63	
Fullerton				6.43	
Geneva	94	44	68.8	3.30	
Genoa (near)	87[f]	44[f]	67.8[f]	6.12	
Gering	93	35	63.8	1.63	
Gothenburg	91	38	67.4	2.38	
Grand Island	95	40	67.3	5.67	
Grant	93	33[c]	65.0	2.26	
Greeley				3.25	
Guide Rock				3.46	
Halsey	94	35	66.8	1.32	
Hartington	85	38	63.9	4.02	
Harvard	87	40	65.6	5.29	
Hastings[e]	94	46	67.5	6.08	
Hayes Center	93	40	63.2	1.95	
Hay Springs	95	29	62.4	0.63	T
Hebron	93	40	69.0	2.63	
Hickman				5.87	
Holbrook				3.59	
Holdrege	91	41	67.0	3.60	
Hooper[e]	84	44	66.0	6.62	
Imperial	91	36	65.0	2.75	
Johnstown				1.58	
Kearney	90	41	67.3	5.88	
Kennedy	94	35	64.1	0.85	
Kimball	87	35	61.2	1.57	
Kirkwood	99	34	66.3	2.03	
Leavitt	92	38	66.2	7.52	
Level				3.10	
Lexington	89	32	65.1	2.86	
Lodgepole	89	32	61.4	2.45	
Loup	88	36	65.8	4.88	
Lynch	98	32	68.0	1.92	
McCook				3.20	
McCool				5.78	
Madison	85	38	65.2	6.17	
Marquette				7.11	
Mason				5.05	
Minden	92	40	66.8	4.07	
Monroe				6.48	
Nebraska City	90	43	68.4	11.34	
Nemaha				8.10	
Norfolk	90	37	66.5	6.14	
North Loup	92	36	65.4	4.23	
Oakdale	86	36	64.1	7.79	
Oakland	91	40	66.5	5.51	
Odell				3.86	
Ord				4.98	
Osceola				7.20	
Palmer				6.17	
Palmyra[e]	86	48	68.4	8.56	
Pawnee City	95	40	66.2	5.93	
Plattsmouth				10.20	
Plymouth	92	42	69.1	3.10	
Purdum	95	35	66.1	1.44	
Ravenna	91	37	66.4	4.49	
Redcloud				2.96	
Rulo				8.05	
St. Libory				6.63	
St. Paul	92	38	67.2	5.26	
Santee	94	37	67.6	5.36	
Seward	91	38	67.4	3.64	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Nebraska—Cont'd.	°	°	°	*Ins.*	*Ins.*
Smithfield				4.43	
Springview	96	40	66.6	1.32	
Stanton	90	36	66.8	7.36	
Strang				3.83	
Stratton				3.16	
Stromsburg				7.60	
Superior	90	35	67.0	1.27	
Syracuse				9.50	
Tablerock				8.36	
Tecumseh	93	40	68.8	6.07	
Tekamah	87	45	67.8	4.86	
Turlington	89	46	68.0	9.34	
University Farm	91	41	68.3	7.69	
Wahoo				8.70	
Wakefield	87	39	65.5	4.82	
Wallace				1.05	
Wauneta				2.79	
Weeping Water				9.10	
Westpoint	89	42	67.0	6.11	
Whitman				1.96	
Wilber				2.54	
Winnebago	87	34	64.9	5.88	
Wisner				7.78	
Wymore				5.27	
York	92	37	67.4	6.27	
Nevada.					
Amos	93	22	58.2	0.03	
Battle Mountain	103	30	70.0	0.10	
Beowawe[e]	96	35	64.4	T.	
Carlin	94	30	57.8	T.	
Carson City	90	27	59.9	0.06	
Elko[e]	92	31	61.6	0.30	
Eureka	83	35	62.8	0.50	5.0
Fenelon				T.	T.
Geyser	92[d]	22[d]	56.8[d]	1.90	
Golconda	89	35	62.5	0.50	
Halleck				1.20	
Hazen	96	34	68.0	T.	
Humboldt	85	33	61.0	0.30	
Lewers Ranch	91	34	62.4	0.60	
Lovelocks	98	30	58.8	0.05	
Martins	98	28	64.8	0.08	
Mill City[e]	80	40	59.2	0.40	
Morey	91	27	59.8	0.75	4.0
Palisade	99	22	61.8	0.00	
Palmetto	85	24	57.0	1.61	6.0
Pioche	96	20	60.2	3.28	
Potts	87	19	53.4	0.95	6.5
Reno State University	90	31	61.4	0.10	
San Jacinto	92	25	56.1	0.45	
Tecoma	88	33	61.5	1.62	
Wabuska	94	25	60.7	T.	
Wadsworth	100	34	69.1	0.00	
Wood	90	27	58.8	0.54	
New Hampshire.					
Alstead	77	35	57.0	6.45	
Bartlett				6.83	
Derlin Mills	82	30	55.9	3.06	
Bethlehem				6.61	T.
Bretton Woods				4.55	
Brookline[e]	76	32	59.7	6.00	
Durham	82	31	58.2	10.68	
Franklin Falls	82	32	58.6	7.25	
Grafton	80	29	66.2	7.31	
Hanover	88	32	58.7	6.10	
Jefferson Highland				3.19	
Keene	83	31	58.4	6.55	
Littleton	74	31	55.4	4.63	
Nashua	82	35	60.8	4.86	
Newton	79	30	58.2	5.77	
North Woodstock				6.55	
Plymouth	78	34	58.0	8.76	
Stratford	79	28	56.8	4.30	
New Jersey.					
Asbury Park	82	40	67.0	4.49	
Bayonne	87	41	66.5	5.38	
Belvidere	87	35	64.8	4.20	
Bergen Point	86	39	65.6	6.69	
Beverly	85	37	66.5	4.70	
Bridgeton	89	40	68.4	5.55	
Browns Mills	84	34	65.4	3.95	
Canton				3.50	
Cape May C. H				3.05	
Charlotteburg	82	28	61.5	6.05	
Chester	88	34	62.3	9.18	
Clayton	88	38	66.6	4.66	
College Farm	85	35	65.0	4.32	
Dover	87	31	61.0	8.73	
Elizabeth	86	38	66.4	5.55	
Englewood	84	36	62.8	7.58	
Flemington	90	36	65.8	4.36	
Friesburg	88	36	67.0	4.77	
Hightstown	85	33	64.0	4.86	
Imlaystown	84	38	66.2	5.76	
Indian Mills	86	33	67.2	4.26	
Lakewood	85	36	64.9	5.30	
Lambertville	86	38	66.2	3.98	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
New Jersey—Cont'd.	°	°	°	*Ins.*	*Ins.*
Layton	87	28	61.2	6.23	
Moorestown	84	37	60.0	3.81	
Newark	86	37	65.7	6.27	
New Brunswick	89	37	67.6	4.06	
Newton	86	33	62.5	8.69	
Oceanic	82	40	65.8	3.37	
Paterson	89	39	66.4	6.24	
Phillipsburg	88	37	65.8	5.69	
Plainfield	86	36	65.0	8.49	
Pleasantville	.....	.....	.....	4.01	
Rancocas	85	42	.....	4.05	
Rivervale	88	29	62.3	5.65	
Sandy Hook	86	47	67.2	4.62	
Somerville	.....	35	.....	6.97	
South Orange	81	36	63.8	6.68	
Sussex	85	33	63.4	6.53	
Toms River	89	32	65.6	4.19	
Trenton	83	41	67.6	4.65	
Tuckerton	82	34	65.2	4.20	
Vineland	89°	40	67.2	5.65	
Woodbine	85	37	66.4	3.07	
Woodstown	.....	.....	.....	5.13	
New Mexico.					
Alamagordo	99	50	71.9	1.78	
Albert	97	44	70.2	2.42	
Albuquerque	97	37	69.0	0.59	
Alma	94	38	69.0	2.70	
Alto	.....	.....	.....	1.92	
Artesia	95	47	71.0	3.52	
Bellranch	97	40	70.4	1.51	
Bloomfield	96	33	65.3	0.75	
Brice	97[a]	32°	72.3°	2.68	
Cambray	.....	.....	.....	0.50	
Carlsbad	100	49	74.8	2.08	
Chama	.....	.....	.....	1.27	
Cimarron	85	30	60.6	2.52	
Cliff	99	39	71.4	2.40	
Deming	97	44	71.2	2.74	
Dorsey	91	33	62.0	1.43	
Eagle Rock Ranch	84	34	61.3	2.25	
Elizabethtown	78	22	51.8	1.24	
Elk	90[b]	41[b]	65.2[b]	4.08	
Espanola	.....	.....	.....	0.29	
Estancia	92	30	61.8	1.16	
Fort Bayard	90	36	66.0	4.07	
Fort Stanton	89	33	61.8	T.	
Fort Union	88	31	60.7	1.44	
Fort Wingate	84	30	60.4	1.55	
Fruitland	92	33	64.4	0.23	
Gage	.....	.....	.....	2.04	
Gallinas Spring	90	42	69.0	1.40	
Garcia	.....	.....	.....	1.95	
Gran Quivira	.....	.....	.....	1.95	
Hillsboro	94	45	69.4	4.24	
Hope	.....	.....	.....	1.97	
Laguna	94	34	66.0	1.25	
Lagunita	95	36	66.8	2.71	
Lake Valley	.....	.....	.....	3.10	
Las Vegas	88	32	61.7	4.25	
Lordsburg	99	46	72.0	2.59	
Los Alamos	.....	.....	.....	2.58	
Luna	87	28	59.4	2.81	
Magdalina	.....	.....	.....	1.55	
Manuelito	.....	.....	.....	1.29	
Mesilla Park	99	43	72.7	3.08	
Mimbres	.....	.....	.....	1.21	
Mineral Hill	.....	.....	.....	2.64	
Mountain Air	92	26	60.0	3.12	
Nara Visa	.....	.....	.....	2.85	
Portales	98	38	71.0	1.22	
Raton	89	34	62.5	.....	
Redrock	.....	.....	.....	1.49	
Rincon	98	48	72.8	1.69	
Rociada	81	26	55.1	1.74	
Rosa	.....	.....	.....	1.29	
Rosedale	.....	.....	.....	2.25	
San Marcial	106	43	73.3	.....	
San Rafael	94	30	64.0	2.41	
Socorro	97	40	67.8	7.96	
Springer	90	31	62.4	2.10	
Strauss	.....	.....	.....	1.59	
Taos	93[d]	31[d]	62.8[d]	0.97	
Trampas	.....	.....	.....	1.91	
Tres Piedras	83	28	56.2	0.92	
Tucumcari	95	44	72.0	2.50	
Valley	.....	.....	.....	1.70	
Vermejo	85	29	56.8	1.06	
Weed	.....	.....	.....	2.35	
Whiteoaks	.....	.....	.....	1.32	
Winsors	79[f]	24[f]	53.4[f]	3.55	
New York.					
Adams	85	28	60.2	3.49	
Addison	91	31	63.0	2.63	
Akron	.....	.....	.....	1.32	
Amsterdam	84	33	61.0	4.21	
Angelica	80	26	57.6	2.58	
Appleton	90	35	63.7	0.99	
Arcade	85	22	58.4	1.89	
Athens	86	36	62.5	3.87	
Atlanta	88	31	60.8	2.20	
Atwater	.....	.....	.....	3.28	
Auburn	89	35	62.4	2.64	
Avon	84	32	62.0	1.51	
Baldwinsville	84	35	61.8	3.67	
Ballston Lake	82	34	60.0	5.01	
Bedford	85	38	64.3	3.60	
Berlin	86	32	60.0	4.45	
Blue Mountain Lake	.....	.....	.....	8.50	
Bolivar	87	25	59.8	2.53	
Bouckville	81	28	58.0	3.97	
Brockport	88	34	63.1	1.96	
Cape Vincent	82	37	61.4	2.45	
Carmel	83	34	61.6	5.03	
Carvers Falls	83	34	59.4	5.09	
Chatham	85	33	62.4	2.75	
Chazy	78	33	59.5	3.90	
Coeymans'	85	34	62.2	.....	
Cold Spring Harbor	85	36	63.8	5.76	
Cooperstown	79	33	58.0	4.54	
Cortland	83	32	60.0	3.09	
Cutchogue	81	37	64.3	4.63	
Dekalb	85°	30°	59.9°	1.94	
De Ruyter	85	30	58.8	3.49	
Easton	.....	.....	.....	4.43	
Elba	85	31	62.6	1.34	
Elmira	98	34	64.6	2.18	
Faust	81	29	56.6	4.15	
Fayetteville	88	33	63.0	2.45	
Fort Plain	83	37	63.0	4.77	
Franklinville	86	24	59.2	2.10	
Gabriels	.....	.....	.....	1.85	
Gansevoort	.....	.....	.....	6.54	
Glens Falls	84	35	59.6	6.30	
Gloversville	84	30	58.8	6.43	
Greenfield	86	33	59.4	7.02	
Greenwich	80[d]	34[d]	59.2[d]	5.35	
Griffin Corners	83	25	56.5	3.24	
Harkness	78	34	58.8	3.88	
Haskinville	.....	.....	.....	3.35	
Hemlock	81	34	62.6	1.22	
Hunt	92	28	60.6	2.22	
Indian Lake	88	26	58.2	6.20	
Ithaca	85	36	61.4	3.66	
Jamestown	89	32	61.6	3.01	
Jeffersonville	87	28	59.8	5.09	
Keene Valley	82	28	57.7	5.82	
Lake George	83	35	59.0	7.07	
Le Roy	85	33	62.4	1.34	
Littlefalls, City Res.	79	34	60.4	6.14	
Lockport	84	33	63.2	1.22	
Lowville	85	31	57.8	3.60	
Lyndonville	.....	.....	.....	1.17	
Lyons	96	35	64.6	1.50	
Middletown	83	40	63.4	7.06	
Mohonk Lake	80	36	60.2	7.60	
Moira	80	33	60.2	3.44	
Mount Hope	87	33	63.8	5.79	
Newark Valley	.....	.....	.....	4.61	
New Lisbon	81	27	56.8	4.75	
North Hammond	83	34	62.6	2.15	
North Lake	82	18	51.4	6.99	
Ogdensburg	83	33	61.8	1.30	
Oneonta	90	31	62.4	3.00	
Otto	86	31	62.7	2.93	
Oxford	82	32	59.8	4.68	
Perry City	86	30	59.0	2.48	
Plattsburg	84	35	60.5	4.48	
Port Jervis	86	34	62.8	5.51	
Potsdam	83	31	60.2	2.15	
Richland	86	22	61.0	0.91	
Richmondville	85	33	60.5	3.27	
Ridgeway	87	35	64.0	1.39	
Ripley	90	38	64.2	3.30	
Romulus	89	36	63.0	1.94	
Salisbury Mills	87	31	60.2	4.48	
Saranac	80	28	56.0	5.56	
Scarsdale	80	36	61.6	4.20	
Setauket	79	41	64.4	5.14	
Shortsville	87	34	62.4	0.77	
Skaneateles	.....	.....	.....	1.67	
Southampton	75	36	63.2	6.92	
South Canisteo	87	29	60.2	2.40	
South Kortright	83	28	58.1	4.35	
South Schroon	83	30	57.0	5.84	
Spier Falls	87	35	59.8	6.16	
Taberg	81	31	59.0	4.91	
Ticonderoga	81	35	63.1	4.62	
Volusia	83	35	61.6	2.31	
Wappinger Falls	82	36	62.8	6.10	
Warwick	.....	.....	.....	3.71	
Watertown	84	29	61.0	2.36	
Waverly	89	29	61.8	3.30	
Wedgwood	84	34	60.4	2.96	
Wells	85	28	57.4	7.54	
West Berne	80	29	59.8	1.81	
Westfield	86	37	63.1	3.27	
Windham	81	32	58.8	1.83	
Youngstown	.....	.....	.....	2.31	
North Carolina.					
Beaufort	88	57	76.9	6.28	
Brevard	90	49	68.5	2.40	
Brewers	92	44	70.2	0.99	
Buck Springs	78	45	61.6	0.75	
Catawba	.....	.....	.....	0.84	
Currituck	.....	.....	.....	9.60	
Eagletown [45]	86	44	70.2	3.58	
Edenton	89	44	71.1	7.50	
Fayetteville	92	50	73.4	7.37	
Goldsboro	91	46	72.8	2.46	
Graham	.....	.....	.....	3.73	
Greensboro	94	48	72.3	0.50	
Greenville	.....	.....	.....	6.96	
Henderson	88	55	73.2	2.11	
Hendersonville	86	43	66.8	1.83	
Henrietta	94	52	74.2	2.05	
Horse Cove	83	50	68.2	1.59	
Hot Springs	88	52	70.9	.....	
Jefferson	85[j]	46[j]	65.7[j]	2.31	
Kinston	96	45	74.2	1.70	
Lenoir	93	46	71.8	1.00	
Lexington	95	46	72.8	0.24	
Lincolnton	95	51	73.6	0.04	
Linville	77	37	60.2	0.00	
Louisburg	89	45	71.3	2.50	
Lumberton	97	50	75.3	1.50	
Manteo	86	56	74.0	6.59	
Marshall	96	50	70.4	0.22	
Moncure	94	45	73.6	2.75	
Monroe	93	50	72.1	1.31	
Morganton	91	50	71.2	1.24	
Mountairy	92	43	70.4	1.05	
Mount Holly	.....	.....	.....	0.79	
Murphy	.....	.....	.....	0.70	
Nashville	95	42	73.1	2.81	
Newbern	93	49	75.2	7.01	
Patterson [41]	84	47	65.0	1.70	
Pinehurst	94	54	75.1	2.03	
Pink Beds	81	37	61.6	1.43	
Pittsboro	95	44	72.9	0.81	
Randleman	.....	.....	.....	1.05	
Reidsville	93	48	72.1	0.99	
Salem	94	45	71.6	0.60	
Salisbury	96°	46°	73.9°	0.51	
Saxon	90	44	70.6	2.33	
Scotland Neck	91	45	73.3	3.07	
Selma	95	52	74.2	4.70	
Settle	90	47	70.4	0.98	
Snowhill	95	42	73.6	1.57	
Southern Pines	94	50	73.9	2.61	
Southport	92	60	79.2	2.19	
Statesville	92	48	72.3	1.30	
Tarboro	95	50	75.6	3.00	
Vade Mecum	91	41	69.2	1.93	
Washington	94	44	73.2	4.68	
Waynesville	84	46	64.8	1.46	
Weldon	93	42	72.8	4.12	
Whiteville	94	50	74.5	4.27	
North Dakota.					
Amenia	91	38	62.6	1.24	
Ashley	89	30	59.0	1.28	
Berlin	92	30	58.8	0.44	
Bottineau	92	32	58.1	2.55	
Buford	90	32	60.5	1.76	
Cando	92	26	58.6	1.77	
Cooperstown	90	34	60.1	0.98	
Denhoff	93	33	61.2	1.04	
Dickinson	98	28	60.4	2.06	
Donnybrook	93	32	57.8	1.54	
Dunseith	90	31	56.4	1.73	
Edgeley	91	32	60.7	0.85	
Edmore	94	35	60.4	1.92	
Fargo	89	37	61.4	1.04	
Forman	89	38[d]	63.0	1.34	
Fort Berthold	99[i]	33	61.2	1.27	
Fullerton	89	33	60.1	0.68	
Glenullin	95[h]	38[h]	59.6[h]	1.40	
Hamilton	90	28	59.2	1.56	
Hannah	90	23	57.2	3.10	
Jamestown	96	35	61.6	1.29	
Kulm	90	32	60.7	1.33	
LaFollette	93	29	56.4	1.08	
Lamoure	.....	.....	.....	0.22	
Langdon	85	28	58.0	2.05	
Larimore	92	33	59.4	2.18	
Lisbon	92	34	59.8	0.63	
McKinney	91	29	56.2	1.85	
Manfred	93	32	59.0	1.42	
Medina	86	38	64.8	3.14	
Medora	95	30	61.8	1.30	
Melville	96[d]	35[d]	61.4[d]	0.45	
Milton	89	30	56.8	0.85	
Minnewaukon	91[g]	35[g]	61.2[g]	0.77	
Minot	94	32	56.8	2.59	
Minto	87[c]	32	58.1	3.68	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
North Dakota—Cont'd.	°	°	°	*Ins.*	*Ins.*
Moyersville	93	33	60.2	1.10	
Napoleon	94	30	60.4	1.35	
New England	98	30	62.9	1.55	
Oakdale	93	35	61.7	1.68	
Park River	89	32	60.8	3.62	
Pembina	87	26	58.4	1.54	
Portal	90	33	54.7	2.84	
Power	91	37	61.4	1.87	
Pratt	93	29	57.7	0.84	
Rolla	86	28	58.0	7.17	
Steele	91[c]	33[f]	61.5[f]	0.87	
Tioga	89[d]	31[d]	58.8[d]	1.70	
University	89	32	60.4	2.81	
Wahpeton	89	39	61.8	1.91	
Walhalla	90	33	60.4	1.97	
Washburn	96	36	62.7	0.55	
Westhope	91	31	56.4	2.06	
Willow City	94	28	56.8	0.80	
Wishek	.....	.....	.....	1.06	
Ohio.					
Akron	85	38	63.7	3.11	
Amesville	91	35	67.4	5.81	
Atwater	.....	.....	.....	2.48	
Bangorville	86	40	64.6	7.53	
Bellefontaine	88	40	64.3	5.70	
Benton Ridge	86	39	65.4	3.98	
Bladensburg	87	35	64.6	4.28	
Bowling Green	89	36	65.0	2.45	
Bucyrus	87	36	62.2	2.08	
Cadiz	87	39	65.6	4.23	
Cambridge	90	36	65.8	4.13	
Camp Dennison	91	39	68.0	2.19	
Canal Dover	84	36	62.6	5.25	
Canton	83	39	62.8	3.30	
Cardington	87	34	63.8	5.72	
Chillicothe	91	36	66.8	1.99	
Circleville	88	40	66.8	2.45	
Clarington	91	40	67.3	2.65	
Clarksville	88	41	67.8	2.17	
Cleveland *a*	86	43	64.5	2.67	
Cleveland *b*	86	42	64.3	2.60	
Coalton	91	34	66.1	1.44	
Colebrook	81	33	60.8	3.65	
Dayton	91	40	66.8	4.45	
Defiance	91	39	64.8	2.34	
Delaware	87	36	64.9	4.78	
Demos	88	39	65.0	3.75	
Findlay	92	39	66.7	4.99	
Frankfort	89	35	67.4	3.31	
Fremont	91	39	66.6	2.91	
Garrettsville	87	34	62.5	4.62	
Granville	88	37	65.4	3.58	
Gratiot	85	38	64.1	5.23	
Green	90	40	67.4	2.10	
Greenhill	86	33	61.6	4.05	
Greenville	86	42	65.1	4.32	
Hedges	91	35	65.5	2.74	
Hillhouse	87	32	61.9	3.36	
Hiram	84	39	63.7	5.13	
Hudson	87	33	63.0	4.57	
Ironton	93	41	70.0	0.63	
Jacksonburg	92	43	69.2	2.86	
Killbuck	87	39	64.4	4.82	
Lancaster	87	37	65.6	2.75	
Lima	86	41	65.0	4.46	
McConnelsville	90	37	65.8	2.92	
Manara	85	37	64.4	3.06	
Mansfield	.....	.....	...	4.20	
Marietta	86	40	66.5	4.26	
Marion	89	36	65.4	5.20	
Medina	88	34	64.2	3.58	
Milfordton	87	36	63.8	4.59	
Milligan	88	33	64.8	3.21	
Millport	85	33	61.8	3.16	
Montpelier	88	39	64.9	2.28	
Napoleon	91	40	64.8	1.76	
Nellie	86	39	64.8	3.55	
New Alexandria	90	37	65.5	4.02	
New Berlin	88	37	64.4	3.93	
New Bremen	91	40	66.4	6.89	
New Richmond	90	43	68.9	1.27	
New Waterford	85	33	62.2	3.20	
North Lewisburg	86	39	66.2	5.30	
North Royalton	86	37	63.7	3.18	
Norwalk	89	36	65.2	2.65	
Oberlin	88	36	64.0	1.61	
Ohio State University	86	38	64.4	4.26	
Orangeville	87	30	62.3	3.49	
Ottawa	91	38	66.2	3.57	
Pataskala	88	38	65.1	4.57	
Philo	87	39	67.1	4.30	
Plattsburg	87	38	65.4	3.20	
Pomeroy	89	38	65.8	1.06	
Portsmouth	89	41	68.4	1.17	
Pulse	86	40	66.6	1.34	
Rockyridge	92	40	66.5	2.05	
Shenandoah	87	38	62.6	3.45	
Sidney	91	40	66.8	5.50	
Somerset	88	41	67.0	4.03	
South Lorain	89	36	64.3	2.01	
Springfield	.....	.....	.....	5.02	
Thurman	95	39	69.6	0.80	
Tiffin	86	40	64.8	3.43	
Toledo (St. Johns College)	89	42	66.1	1.97	
Upper Sandusky	87	38	66.0	3.18	
Urbana	87	37	64.9	7.59	
Vickery	92	37	65.6	2.56	
Warren	89	34	64.0	2.96	
Wauseon	92	37	64.6	1.54	
Waverly	92	37	68.2	1.53	
Waynesville	85	41	65.9	3.23	
Wellington	.....	.....	.....	3.35	
Willoughby	.....	.....	.....	2.02	
Wilson	89	35	66.7	1.49	
Wooster	87	36	63.8	5.10	
Zanesville	.....	.....	.....	4.46	
Oklahoma.					
Alva	.....	.....	.....	3.64	
Arapaho	105	44	75.6	1.96	
Beaver	103	56	77.6	3.45	
Blackburn	100	44	75.0	3.65	
Chandler	99	52	77.4	1.38	
Cleo	.....	.....	.....	2.90	
Cloud Chief	93	47	73.5	2.36	
Enid	102	46	75.4	3.70	
Erick	101	45	74.2	3.50	
Fort Reno	100	47	74.9	2.85	
Fort Sill	99	50	76.8	4.26	
Gage	96	42	74.0	3.69	
Grand	.....	.....	.....	3.57	
Guthrie	98	48	75.8	1.78	
Harrington	98	44	72.8	3.39	
Hennessey	104	46	77.0	1.87	
Hobart	100	48	76.2	3.32	
Jefferson	103	47	75.4	3.36	
Jenkins	104	47	75.4	2.25	
Kenton	93	41	69.5	2.18	
Kingfisher	102	48	76.2	1.40	
McComb	97	47	87.1	3.05	
Mangum	97	50	77.8	3.70	
Meeker	96	49	75.9	2.21	
Newkirk	103	48	76.9	3.99	
Norman	98	45	75.2	2.59	
Okeene	103	46	75.8	1.88	
Perry	100	47	74.8	2.00	
Sac and Fox Agency	95	49	75.4	2.80	
Shawnee	98	49	76.0	3.67	
Stillwater	97	49	74.8	2.38	
Taloga	105[e]	43[e]	71.0[e]	4.46	
Temple	102	49	77.1	4.50	
Watonga	.....	.....	.....	2.35	
Waukomis	105	48	76.4	2.07	
Weatherford	101	47	74.8	3.05	
Whiteagle	101	46	75.6	3.37	
Woodward	.....	.....	.....	2.00	
Oregon.					
Alba	.....	.....	.....	1.47	
Albany	.....	.....	.....	1.29	
Alpha	87	34	60.4	4.60	
Arlington	90	42	68.3	0.25	
Ashland	93	39	62.2	0.60	
Astoria	84	45	59.1	7.38	
Aurora (near)	89	41	59.8	3.75	
Bay City	86	39	57.8	5.78	
Bend	90[e]	25[e]	50.3[e]	0.41	
Beulah	95	21	57.7	0.49	
Blackbutte	80	40	56.1	1.60	
Blalock	93	43	70.0	1.02	
Bonita	95	40	62.4	2.81	
Bullrun	.....	.....	.....	5.11	
Burns	89	27	58.3	0.62	
Carlton	90	34	59.3	2.98	
Cascade Locks	85	44	62.4	5.43	
Coquille	.....	.....	.....	1.75	
Corvallis	95	40	61.4	1.25	
Dale	.....	.....	.....	1.23	
Dayville	90	36	60.9	0.73	
Doraville	86	40	59.2	2.76	
Drain	91	34	61.0	0.89	
Echo	93	37	65.8	0.79	
Ella	90[b]	45[b]	67.5[b]	0.57	
Eugene	84	41	60.9	1.43	
Fairview	88	40	58.2	2.08	
Falls City	89	38	59.6	3.49	
Forestgrove	88	37	59.5	2.98	
Gardiner	81	43	57.8	2.88	
Glendale	94	34	60.6	0.44	
Glenora	88	34	58.4	9.79	
Gold Beach	80	38	57.9	3.03	
Government Camp	77	31	50.6	7.41	
Granite	.....	.....	.....	0.84	
Grants Pass	96	36	62.2	0.60	
Grass Valley	85	30	56.0	0.75	
Heisler	87	30	59.6	.....	
Heppner	90	37	62.4	1.14	
Hood River	88	39	61.7	1.67	
Huntington	90	36	65.1	0.27	
Jacksonville	95	36	63.9	0.89	
John Day	98	34	63.6	1.30	
Joseph	88	28	56.0	1.62	1.5
Kerby	93	37	60.4	1.01	
Klamath Falls	94	25	60.8	0.50	
Lagrande	98	31	59.6	1.50	
Lakeview	92	23	57.4	0.50	
Lonerock	93	32	58.1	1.78	
McKenzie Bridge	98	34	58.6	4.26	
McMinnville	89	38	60.4	2.76	
Marshfield	80	40	60.2	1.48	
Mill City	94	37	58.3	2.64	
Monroe[k]	84	41	63.0	.....	
Mount Angel	95	46	62.8	3.93	
Nehalem	.....	.....	.....	6.21	
Newport	71	45	57.2	3.73	
Odell	.....	.....	.....	0.39	
Paisley[k]	82	27	56.7	.....	
Pendleton	94	34	61.8	1.94	
Port Oxford	74	45	57.6	3.16	
Prineville	86	29	56.6	1.36	
Salem	89	45	62.2	2.86	
Silverlake	86	20	50.6	1.34	
Sparta	95	28	58.0	0.71	
Stafford	95	41	61.4	3.69	
The Dalles	89	39	64.6	1.19	
Tipton	.....	.....	.....	0.70	
Toledo	84	33	57.9	2.76	
Umatilla	94	39	68.2	0.48	
Vale	94	31	64.0	0.07	
Van	.....	.....	.....	0.04	
Vancycle	.....	.....	.....	1.06	
Wallowa	90	28	55.9	1.94	
Wamic	82	27	56.8	0.30	
Warm Spring	94	30	62.4	1.40	
Weston	92	32	61.1	1.48	
Williams	95	31	60.8	0.14	
Pennsylvania.					
Aleppo	88	31	64.2	2.70	
Altoona	89	32	61.4	2.23	
Beaver Dam	.....	.....	.....	4.51	
Bellefonte	90	34	65.8	2.51	
Brookville	.....	.....	.....	4.12	
Browers	.....	.....	.....	3.01	
California	91	38	66.2	2.57	
Cassandra	85	31	59.6	2.15	
Centerhall	86	34	62.2	2.21	
Clarion	.....	.....	.....	3.38	
Claysville	89	31	64.7	2.34	
Coatsville	88	36	66.7	3.65	
Confluence	.....	.....	.....	1.98	
Coudersport	86	27	59.8	2.21	
Davis Island Dam	.....	.....	..	2.63	
Derry	90	31	64.8	2.92	
Doylestown	.....	.....	.....	4.65	
Easton	82	36	64.7	4.64	
Ellwood Junction	.....	.....	.....	3.38	
Emporium	84	34	61.4	3.54	
Ephrata	90	35	65.8	2.30	
Everett	86	33	62.6	2.72	
Forks of Neshaminy	.....	.....	.....	2.98	
Franklin	87	33	62.4	3.11	
Freeport	90	36	63.8	3.50	
Gettysburg	86	36	65.5	2.80	
Girardville	.....	.....	.....	4.32	
Gordon	87	29	62.2	5.27	
Greensboro	.....	.....	.....	1.70	
Greenville	87	34	62.8	2.81	
Hamburg	86	35	67.3	6.80	
Hanover	93	37	67.6	2.58	
Herrs Island Dam	.....	.....	.....	2.75	
Huntingdon	.....	.....	.....	2.13	
Indiana	85	33	63.0	3.05	
Irwin	93	33	65.4	3.15	
Johnstown	.....	.....	.....	3.90	
Keating	.....	.....	.....	1.90	
Lansdale	.....	.....	.....	3.81	
Lawrenceville[d]	90	28	62.4	.....	
Lebanon	86	35	65.8	2.73	
Leroy	84	33	60.8	3.04	
Lewisburg	87	35	64.7	3.39	
Lockhaven	86	34	65.6	3.44	
Lock No. 4	.....	.....	.....	2.76	
Lycippus	95	38	65.4	2.34	
Marion	86	36	64.8	2.63	
Mifflintown	85	35	63.8	3.24	
Milford	83	29	61.6	5.35	
Montrose	84	31	60.6	3.60	
New Germantown	87	33	64.9	7.30	
Ottsville	.....	.....	.....	4.55	
Parker	.....	.....	.....	4.22	
Philadelphia	85	45	68.2	4.22	
Pocono Lake	82	27	57.9	5.75	
Point Pleasant	.....	.....	.....	3.96	
Pottsville	.....	.....	.....	4.96	
Reading	87	35	66.7	2.71	
Saegerstown	86	30	61.6	3.02	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Pennsylvania—Cont'd.	°	°	°	*Ins.*	*Ins.*
St. Marys	88	32	61.0	3.23	
Saltsburg	.....	.....	.....	3.20	
Seisholtzville	.....	.....	.....	5.87	
Selinsgrove	86	36	64.8	2.67	
Shawmont	.....	.....	.....	3.37	
Skidmore	89	32	63.3	3.16	
Smiths Corners	.....	.....	.....	4.60	
Somerset	84	29	59.4	2.35	
South Eaton	83	33	62.3	4.66	
Springdale	.....	.....	.....	3.16	
Springmount	.....	.....	.....	3.05	
State College	84	34	63.0	1.88	
Swarthmore	87[f]	38[g]	66.9[g]	4.38	
Towanda	88	31	62.2	2.97	
Uniontown	87	36	65.8	2.66	
Warren	89	34	62.6	3.67	
Wellsboro	85	32	61.4	.....	
Westchester	87	41	67.0	4.50	
West Newton	.....	.....	.....	2.96	
Wilkesbarre	86	35	63.6	3.04	
Williamsport	84	36	63.9	2.95	
Rhode Island.					
Bristol	76	41	62.2	4.76	
Kingston	79	33	60.4	5.86	
Narragansett	76	32	61.8	5.35	
Pawtucket	83	39	64.4	6.59	
Providence a	83	40	64.0	6.51	
South Carolina.					
Aiken	98	63	80.4	0.55	
Anderson	97	56	76.8	0.63	
Beaufort	93	66	78.6	2.60	
Bowman	97	57	76.8	0.69	
Blair	.....	.....	.....	0.24	
Calhoun Falls	.....	.....	.....	1.76	
Camden	.....	.....	.....	2.02	
Chappell	.....	.....	.....	0.18	
Cheraw	90	55	74.0	4.21	
Clarks Hill	95	59	76.9	0.56	
Clemson College	90	56	74.8	1.66	
Conway	92	54	75.8	1.85	
Darlington	96	52	75.2	8.60	
Dillon	98	53	76.6	2.83	
Due West	93	58	75.7	T.	
Edisto	.....	.....	.....	1.88	
Effingham	.....	.....	.....	2.70	
Enoree	.....	.....	.....	2.60	
Florence	98	56	76.5	3.63	
Gaffney	96	52	75.8	1.77	
Georgetown	90	60	76.6	1.71	
Heath Springs	94	55	75.4	2.25	
Kingstree	96	59	78.0	3.36	
Liberty	93	55	75.2	1.60	
Little Mountain	97	58	76.6	0.58	
Lugoff	97	55	75.8	3.15	
Newberry	98	57	77.2	0.17	
Pelzer	.....	.....	.....	1.57	
Pinopolis [h]	88	60	74.0	1.99	
St. George	94	61	76.8	1.00	
St. Matthews	93	60	75.5	0.93	
St. Stephens	.....	.....	.....	1.00	
Saluda	98	53	76.4	0.38	
Santuck	96	57	75.3	1.05	
Seivern	98	49	75.1	2.31	
Smiths Mills	.....	.....	.....	1.42	
Society Hill	90	58	74.4	3.85	
Statesburg	93	60	76.4	2.24	
Summerville	92	60	75.8	3.66	
Trenton	97	60	76.2	0.41	
Trial	97	57	75.8	1.67	
Walhalla	94	55	74.8	2.56	
Walterboro	97	61	77.4	3.43	
Winnsboro	94	60	75.4	0.90	
Yemassee	93	61	77.0	3.89	
Yorkville	96	60	76.3	0.94	
South Dakota.					
Aberdeen	94	37	62.4	0.86	
Academy	98	36	66.7	1.90	
Alexandria	95	38	64.2	1.83	
Armour	95	33	68.0	2.71	
Ashcroft	100	41[i]	62.7[e]	0.60	
Bowdle	92	35	62.7	1.45	
Brookings	38	36	62.7	2.16	
Canton	90	36	64.0	3.18	
Centerville	92	37	64.8	4.56	
Chamberlain	103	37	68.3	0.42	
Clark	91	35	62.3	1.02	
Clear Lake	87	42	62.5	3.35	
Doland	90	37	64.4	1.06	
Elkpoint	90	40	65.8	4.37	
Fairfax	98	38	72.0	1.66	
Farmingdale	.....	.....	.....	0.38	
Faulkton	91	33	62.6	0.52	
Flandreau	89	40	63.6	2.15	
Forestburg	97	34	64.6	0.50	
Fort Meade	94	32	61.4	0.12	
Gannvalley	99	38	66.0	0.53	
Greenwood	93	36	67.9	1.60	
Highmore	94	35	64.6	0.56	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
South Dakota—Cont'd.	°	°	°	*Ins.*	*Ins.*
Hitchcock	.....	.....	.....	1.25	
Hotch City	100	33	64.8	0.26	
Howard	91	30	64.4	2.33	
Howell	95	33	62.6	0.23	
Ipswich	92	33	61.2	0.10	
Kidder	91	34	61.0	0.58	
Kimball	98	41	65.7	0.51	
Marion	92	36	65.8	2.41	
Mellette	95	31	64.0	0.50	
Menno	88	36	64.8	3.72	
Mil'bank	94	40	63.3	2.17	
Mitchell	95	36	65.1	2.87	
Oelrichs	98	32	62.2	0.30	
Pine Ridge	101	30	63.6	0.79	
Plankinton	94	38	65.9	0.88	
Ramsey	91[d]	37[d]	62.4[d]	2.69	
Redfield	92	33	63.0	0.20	
Rosebud Agency	95	36	65.4	1.46	
Rosseau	.....	.....	.....	0.22	
Sioux Falls	93	39	65.2	4.41	
Spearfish	90	35	63.2	0.30	
Stephan	103	34	65.0	0.86	
Vermillion	85[e]	40[e]	65.6[e]	4.80	
Watertown	89	37	61.4	2.17	
Wentworth	91	39	65.0	2.53	
Whitehorse	98	34	63.0	0.44	
Tennessee.					
Andersonville	90	.....	.....	3.70	
Arlington	92	50	72.5	1.84	
Ashwood	90	47	71.2	3.26	
Benton	92	50	73.0	2.34	
Bluff City	.....	.....	.....	2.49	
Bolivar	93	48	73.0	0.74	
Bristol	88	47	73.4	0.60	
Byrdstown	88	49	69.8	4.36	
Carthage	92	51	73.1	3.33	
Cedar Hill	92	49	73.2	2.88	
Celina	.....	.....	.....	3.46	
Charleston	.....	.....	.....	2.44	
Clarksville	88	52	71.8	3.78	
Clinton	.....	.....	.....	0.50	
Covington	90	51	74.2	1.12	
Decatur	92	47	72.2	1.27	
Dickson	92	45	71.8	4.74	
Dover	93	47	73.7	3.45	
Dyersburg	91	53	74.2	1.60	
Elizabethton	90	50	68.8	1.85	
Erasmus	87	36	66.6	1.52	
Florence	88	50	71.4	5.40	
Franklin	90	51	71.6	4.22	
Grace	.....	.....	.....	4.50	
Greeneville	89	50	70.1	0.81	
Hamilton Springs	92[d]	50[d]	72.2[d]	2.86	
Harriman	88	48	70.0	1.43	
Hohenwald	88	41	69.3	1.95	
Iron City	92	48	71.6	3.08	
Isabella	90	51	71.2	2.38	
Jackson	93	49	74.7	2.57	
Johnsonville	91	48	73.0	3.36	
Jonesboro	89	46	69.2	0.77	
Kenton	90	49	72.4	2.45	
Kingston	.....	.....	.....	2.98	
Lafayette	92	46	70.6	2.63	
Leadvale	.....	.....	.....	0.02	
Lewisburg	91	48	72.9	4.72	
Loudon	.....	.....	.....	1.60	
Lynnville	86	50	71.2	3.46	
McGee	.....	.....	.....	0.30	
McMinnville	93	46	71.6	0.79	
Maryville	91	50	72.3	1.49	
Milan	91	49	73.3	1.10	
Newport	88	50	70.8	1.15	
Palmetto	92	47	72.0	2.91	
Pope	92	48	73.0	2.15	
Rogersville	91	47	71.4	2.05	
Rugby	90	40	68.2	3.70	
Savannah	93	50	73.0	1.74	
Sewanee	86	53	70.6	0.71	
Silver Lake	82	43	63.3	1.44	
Springdale	91	45	71.0	3.19	
Springville	91	47	72.4	4.55	
Tazewell	.....	.....	.....	2.96	
Tellico Plains	92	49	72.4	1.27	
Tracy City	93	42	68.8	1.55	
Trenton	93	47	75.5	1.90	
Tullahoma	91	44	71.4	1.86	
Union City	92	48	73.6	2.30	
Walling	.....	.....	.....	3.51	
Waynesboro	87	47	71.2	4.52	
Wildersville	85	53	72.6	2.29	
Yukon	88	52	71.9	3.70	
Texas.					
Albany	104	53	79.8	1.44	
Alvin	.....	.....	.....	2.20	
Arthur	.....	.....	.....	0.33	
Athens	97	54	79.2	0.25	
Austin	92	66	80.8	0.75	
Ballinger	100	57	79.1	0.78	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Texas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Beaumont	.....	.....	.....	3.27	
Beeville	99	63	82.2	1.79	
Big Spring	102	49	78.4	3.38	
Blanco	96	57	77.6	3.08	
Boerne	92	55	75.3	3.80	
Booth	.....	.....	.....	0.63	
Bowie	100	50	79.8	0.93	
Brazoria	91	63	79.8	5.51	
Brenham	97	65	81.4	0.71	
Brownwood	100	50	79.2	0.94	
Channing	99	42	71.0	5.65	
Childress	100	46	75.0	3.75	
Clarksville	97	56	78.2	2.77	
Claude	94	56	75.7	1.86	
Claytonville	99	48	76.8	5.93	
College Station	100	65	82.6	0.96	
Colorado	101	49	76.6	3.71	
Columbia	91	67	80.0	3.88	
Columbus	.....	.....	.....	1.31	
Comstock	97[e]	61[e]	78.4[e]	2.14	
Corsicana	98	59	80.0	2.80	
Crockett	101	58	80.8	1.26	
Cuero	98	63	81.7	4.05	
Dallas	99	54	78.1	2.83	
Danevang	98	63	81.2	3.72	
Decatur	98	57	79.6	1.25	
Dialville	93	58	78.1	1.24	
Dublin	103	55	81.2	0.96	
Duval	95	65	80.6	1.30	
Eagle Pass	103	61	84.2	1.78	
Fort Brown	98	68	83.1	3.92	
Fort Clark	99	60	80.6	3.67	
Fort Davis	89	45	68.2	2.04	
Fort McIntosh	101	63	83.4	4.83	
Fort Ringgold	102	65	85.4	3.53	
Fredericksburg	94	56	77.6	4.18	
Gainesville	98	49	77.1	1.39	
Georgetown	99	58	80.8	2.38	
Gonzales	.....	.....	.....	1.42	
Graham	100	48	79.0	1.43	
Grapevine	99[f]	54[f]	79.4[f]	1.03	
Greenville	100	56	79.7	0.65	
Hale Center	93	45	72.2	4.37	
Hallettsville	97	64	82.0	1.12	
Haskell	103	49	77.6	4.60	
Hempstead	.....	.....	.....	0.35	
Henrietta	101	53	78.8	2.51	
Hereford	94	29	60.1	2.27	
Hewitt	.....	.....	.....	2.30	
Hillsboro	98	57	79.4	3.39	
Houston	96	68	81.8	0.97	
Huntsville	101	56	81.2	0.47	
Jefferson	92	55	76.3	2.49	
Jewett	97	55	79.0	0.90	
Junction	.....	.....	.....	1.27	
Kent	98	44	73.0	1.40	
Kerrville	95	52	77.8	1.11	
Knickerbocker	101	47	78.6	0.44	
Kopperl	.....	.....	.....	0.90	
Lampasas	99	56	80.2	2.67	
Liberty	101	.....	.....	0.40	
Llano	98	52	78.0	2.00	
Longlake	.....	.....	.....	2.31	
Longview	96	57	78.2	2.08	
Luling	96	61	81.8	0.54	
Mann	100	56	80.8	3.82	
Marlin	99	61	80.9	2.18	
Mexia	97	60	80.0	1.08	
Miami	98	42	73.8	1.53	
Mobeetie	98	43	73.0	1.77	
Mount Blanco	94	43	71.8	2.20	
Mount Pleasant	97	52	78.2	3.78	
Nacogdoches	95	55	77.4	2.74	
New Braunfels	95	62	80.4	1.11	
Panter	.....	.....	.....	0.18	
Paris	98	57	78.8	0.84	
Pearsall	100	64	82.6	4.71	
Port Lavaca	96	66	81.9	1.06	
Rhineland	100	49	75.9	4.75	
Riverside	.....	.....	.....	0.40	
Rockland	.....	.....	.....	1.70	
Rockport	88	64	77.2	2.95	
Runge	102	.....	.....	1.93	
Sabinal	100	60	81.8	3.62	
San Marcos	95	62	80.7	0.89	
San Saba	97	52	78.6	1.76	
Santa Gertrude	.....	.....	.....	3.17	
Seymour	100	50	76.5	6.44	
Sherman	95	58	78.8	0.60	
Sonora	97	54	77.0	3.08	
Sugarland	102	63	82.7	1.41	
Sulphur Springs	95	56	78.2	3.75	
Temple	98	59	80.1	7.62	
Texline	95	51	68.3	1.99	
Trinity	.....	.....	.....	0.33	
Tyler	96	57	78.4	3.14	
Valley Junction	.....	.....	.....	0.01	
Victoria	95	64	82.0	2.59	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
***Texas*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Waco	102	61	83.2	2.74	
Waxahachie	100	55	78.9	1.89	
Weatherford	97	56	78.4	3.17	
Wharton	94	62	80.4	0.72	
Wichita Falls	.....	.....	.....	6.22	
Willspoint	98	58	78.2	3.25	
Utah.					
Alpine	.....	.....	.....	4.21	
Alta	.....	.....	.....	3.45	8.5
Aneth	99	38	68.5	1.95	
Beaver	88[b]	17	60.0[e]	2.67	
Blackrock	88	28	59.8	2.57	
Castledale	89	25	56.6	2.23	
Castle Rock	.....	.....	.....	1.50	T.
Cisco	94	41	66.6	1.03	
Clear Creek	.....	.....	.....	1.27	
Corinne	93	33	63.8	1.09	
Coyoto	86	20	54.0	1.46	
Deseret	93	27	60.7	1.79	
Emery	.....	30	.....	0.65	
Experiment Farm	102	39	70.7	.....	
Farmington	87	31	60.9	1.91	
Fillmore	95	31	66.1	2.81	
Fort Duchesne	89	26	61.5	5.92	
Frisco	90	50	63.8	2.32	T.
Garrison	91	28	62.4	0.85	
Giles	97	32	65.8	0.87	
Government Creek	88	29	62.3	1.96	
Grayson	100	32	65.8	2.89	
Heber	90	24	57.1	2.12	
Henefer	90	20	56.8	1.32	
Hite	104	42	73.8	1.59	
Huntsville	.....	.....	.....	1.12	
Ibapah	87	23	57.0	0.40	1.0
Indianola	.....	.....	.....	0.95	
Kanab	90[h]	28[h]	59.8[h]	1.80	
Kelton *[1]	92	29	52.8	1.63	T.
La Sal	82	30	59.0	1.48	
Levan	86	28	60.3	3.68	2.5
Loa	85	25	55.5	1.05	
Logan	89	34	64.4	2.07	
Lucin	88	33	61.4	0.80	
Manti	89[e]	30[f]	58.8[f]	3.09	.....
Marion	.....	.....	.....	2.08	
Marysvale	88	26	58.0	2.28	T.
Meadowville	89	25	56.4	1.40	
Millville	.....	.....	.....	1.83	
Moab	101	35	68.0	1.95	
Morgan	87	24	57.7	1.39	
Mount Nebo	92	33	64.2	1.70	
Nephi	.....	.....	.....	2.86	2.0
Oak City	94	29	65.0	2.29	
Ogden	84	33	63.9	1.51	
Panquitch	.....	.....	.....	1.62	
Parowan	92	26	59.4	3.80	6.0
Payson	.....	.....	.....	2.60	
Pinto	88[d]	25[d]	56.4[d]	4.82	T.
Plateau	84	26	56.0	1.44	T.
Ranch	87	21	55.3	3.26	8.0
Randolph	.....	.....	.....	1.32	
Rockville	103	36	75.2	1.92	
Salt Air	90	40	67.6	1.42	
Scipio	89	25	59.4	2.88	T.
Snowville	91	26	58.4	1.35	
Soldier Summit	83	20	50.8	2.05	1.0
Strawberry Valley	.....	.....	.....	3.04	
Sunnyside	.....	.....	.....	4.72	
Tooele	86	33	64.6	2.19	
Trout Creek	93	26	62.2	1.67	
Utah Lake	90	29	58.8	2.92	
Vernal	84	34	61.0	1.81	
Wellington	93[c]	29[c]	60.6[c]	2.20	
Woodruff	83	12	51.1	.....	
Vermont.					
Burlington	80	41	60.8	4.32	
Cavendish	83	30	57.4	6.60	
Chelsea	73	29	54.4	5.26	
Cornwall	81	34	59.7	5.50	
Enosburg Falls	81	29	57.4	3.69	
Jacksonville	80	29	54.1	7.51	
Manchester	77	33	57.0	6.08	
Norwich	78	30	56.2	6.96	
St. Johnsbury	80	30	58.0	4.79	
Wells	75	34	57.6	5.30	
Westfield	.....	.....	.....	3.94	
Woodstock	82	30	53.6	6.60	
Virginia.					
Alexandria	88	40	68.2	.....	
Arvonia	89	40	68.8	4.80	
Ashland	90	43	69.6	3.10	
Barboursville	87	45	68.8	3.98	
Bigstone Gap	84	47	67.6	3.17	
Blacksburg	85	39	64.7	2.20	
Buchanan	.....	.....	.....	2.44	
Burkes Garden	80	36	60.8	2.63	
Callaville	.....	.....	.....	2.55	
Cape Henry	93	51	72.2	3.51	
Charlottesville	89	46	70.6	3.96	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
***Virginia*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Clarksville	.....	.....	.....	2.56	
Columbia	87	44	68.2	4.50	
Dale Enterprise	86	35	65.8	1.69	
Danville	.....	.....	.....	2.78	
Dinwiddie	91	35	68.9	1.91	
Fredericksburg	88	39	67.8	2.92	
Grahams Forge	83[e]	42[e]	64.8[e]	4.22	
Greenwich	88	40	67.8	3.12	
Hampton	83	64	72.6	3.72	
Hot Springs	82	38	61.6	2.90	
Ivanhoe	.....	.....	.....	2.49	
Lexington	91	40	67.8	1.40	
Lincoln	92	33	67.6	2.75	
Marion	86	40	66.2	2.31	
Mendota	.....	.....	.....	1.37	
Newport News	91	55	73.5	3.50	
Petersburg	.....	35	.....	1.59	
Quantico	90	44	68.5	1.32	
Radford	.....	.....	.....	1.92	
Randolph	.....	.....	.....	1.17	
Riverton	.....	.....	.....	1.46	
Roanoke	90[e]	.....	.....	4.25	
Rockymount	90	40	69.4	4.67	
Saxe	91	40	70.2	3.24	
Shenandoah	.....	.....	.....	1.44	
Speers Ferry	.....	.....	.....	1.52	
Spottsville	92	40	70.0	3.57	
Staunton	90	41	67.6	1.91	
Stephens City	91	37	67.0	2.12	
Warsaw	92	38	70.9	3.53	
Williamsburg	91	40	69.4	4.51	
Woodstock	93	36	68.4	1.31	
Washington.					
Aberdeen	92	39	59.6	7.60	
Anacortes	71	25	56.2	3.46	
Ashford	.....	.....	.....	5.01	
Bellingham	72	40	57.2	6.82	
Blaine	73	42	56.2	7.15	
Brinnon	80	40	58.4	3.96	
Cedonia	87	28	57.1	0.45	
Centralia	86	33	60.1	3.35	
Cheney	91	28	53.0	0.56	
Clearbrook	85	56	57.0	8.07	
Cle Elum	87	25	58.6	0.76	
Colville	87	30	58.4	0.77	
Conconully	82	29	56.6	2.26	
Coupeville	80	44	58.2	1.81	
Crescent	90	25	58.9	0.40	
Cusick	89	29	56.6	0.78	
Danville	87	37	58.9	1.55	
Dayton	94	34	62.1	1.68	
East Sound	73	31	53.7	5.95	
Ellensburg	85	29	58.4	0.38	
Ephrata	90	34	64.6	0.70	
Fort Simcoe	.....	.....	.....	0.40	
Granite Falls	.....	.....	.....	3.86	
Hatton	92	25	63.3	0.27	
Horse Heaven	.....	.....	.....	0.11	
Ilwaco	86	46	58.2	7.92	
Kennewick	93	37	66.6	0.16	
Kiona	91	35	65.2	0.36	
Lacenter	87	40	58.0	3.35	
Lakeside	88	39	63.5	0.93	
Lester	88	38	59.5	2.23	
Lind	90	23	61.6	0.69	
Loomis	83	40	59.8	1.71	
Merritt	.....	.....	.....	2.62	
Mottinger Ranch	97	40	69.7	0.50	
Mount Pleasant	86	42	61.0	4.51	
Moxee	89	28[k]	60.8[f]	0.40	
Northport	85	32	55.4	1.53	
Olga	73	45	56.0	5.73	
Olympia	82	37	59.0	3.33	
Pinehill	90	37	63.2	1.26	
Pomeroy	94	33	60.6	2.02	
Port Townsend	73	45	57.5	1.43	
Pullman	92	35	59.6	3.34	
Rattlesnake	83	34	61.5	0.68	
Republic	84	32	56.0	2.08	
Rosalia	89	32	58.0	1.34	
Sedro	75	38	57.8	5.39	
Snohomish	74	45	59.1	2.72	
Snoqualmie	81	41	59.2	1.87	
Tekoa	.....	.....	.....	2.15	
Touchet	94	37	66.4	0.44	
Twisp	88	30	59.4	1.43	
Union	82	37	59.8	6.27	
Vancouver	91	42	62.9	2.53	
Vashon	74	44	59.2	2.74	
Wahluke	90	40	65.2	0.02	
Waterville	84	30	57.4	0.56	
Wenatchee (near)	82	35	60.0	0.22	
Wilbur	88	25	56.6	0.84	
Zindel	97	39	68.2	1.54	
West Virginia.					
Bancroft	92	40	70.4	1.21	
Bayard	82	29	59.4	1.80	
Bens Run	90	41	68.0	2.75	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
***West Virginia*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Berkley Springs	92	34	67.6	1.99	
Bluefield	86	46	66.3	1.80	
Buckhannon	89	93	64.0	2.19	
Burlington	86	32	63.8	1.95	
Cairo	90	34	67.4	2.14	
Central	90	33	64.8	2.79	
Charleston	88	45	69.8	1.05	
Creston	91	32	66.2	3.27	
Cuba	91	34	66.4	1.18	
Durbin	81	34	59.9	0.99	
Elkhorn	86	44	66.2	4.21	
Fairmont	87	35	65.2	2.81	
Glenville	92	37	68.6	1.98	
Grafton	88	34	65.5	2.34	
Green Sulphur Springs	89	41	64.4	1.61	
Harpers Ferry	.....	.....	.....	2.88	
Hinton	.....	.....	.....	1.96	
Huntington	90	40	68.2	0.60	
Lewisburg	87	41	64.2	3.23	
Logan	88	46	68.8	2.80	
Lost Creek	89	34	64.2	2.43	
Marlinton	89	34	65.2	2.71	
Martinsburg	87	38	65.0	1.90	
Moorefield	97	32	68.1	1.40	
Morgantown	87	35	66.0	1.96	
Moundsville	89	36	66.4	2.69	
New Cumberland	84	33	63.8	4.15	
New Martinsville	92	38	68.4	2.69	
Nuttallburg	86	40	64.2	0.25	
Oceana	89	45	66.8	2.60	
Parsons	88	31	62.9	2.47	
Philippi	89	32	64.5	2.14	
Pickens	84	35	62.0	1.91	
Point Pleasant	91	41	69.9	0.54	
Princeton	80	38	60.6	4.10	
Romney	89	33	64.0	1.23	
Rowlesburg	.....	.....	.....	2.53	
Ryan	90	32	66.2	1.11	
Smithfield	88	35	66.0	2.99	
Southside	90	39	62.7	1.39	
Sutton	94	40	69.8	1.65	
Terra Alta	85	38	63.0	2.75	
Uppertract	90	32	64.7	0.73	
Valley Fork	92	37	67.4	1.49	
Wellsburg	83	39	64.2	2.69	
Weston	.....	.....	.....	2.02	
Wheeling	.....	.....	.....	3.50	
Williamson	87	45	66.8	3.22	
Wisconsin.					
Amherst	93	38	62.9	3.36	
Antigo	82	30	57.2	.....	
Appleton	82	39	63.2	3.80	
Appleton Marsh	85	32	60.6	3.85	
Ashland	.....	.....	.....	6.58	
Barron	88	34	61.1	3.70	
Berlin	87	34	62.4	1.75	
Black River Falls	.....	.....	.....	3.64	
Burnett	86	36	62.4	1.31	
Butternut	83	27	58.6	4.44	
Chilton	89	37	63.5	1.77	
Chippewa Falls	.....	.....	.....	3.46	
Citypoint	.....	.....	.....	3.26	
Cranberry Ex. Sta	89	22	58.2	4.61	
Darlington	91	33	63.2	1.76	
Downing	84	32	59.5	2.30	
Eau Claire	85	41	63.2	4.43	
Florence	85	32	58.6	4.96	
Fond du Lac	87	35	62.8	1.39	
Grand Rapids	86	37	62.2	2.33	
Grand River Locks	.....	.....	.....	3.48	
Hancock	84	38	62.2	3.68	
Harvey	86	38	63.8	3.02	
Hayward	83	28	59.0	3.93	
Hillsboro	87	35	61.8	2.08	
Koepenick	85	28	59.4	5.10	
Lancaster	86[d]	41[d]	66.0[d]	1.95	
Manitowoc	83	44	62.2	2.21	
Mauston	84	37	62.7	1.36	
Meadow Valley	89	33	61.6	4.40	
Medford	95	34	62.8	3.92	
Menasha	.....	.....	.....	3.07	
Merrill	86	31	59.6	3.38	
Minocqua	80	28	58.8	2.92	
Mount Horeb	87	38	64.3	0.94	
Neillsville	86	36	62.8	4.02	
New London	86	37	62.8	2.90	
New Richmond	89[e]	40[e]	63.1[e]	3.02	
Oconto	87	38	62.3	2.62	
Osceola	82	35	60.8	6.01	
Oshkosh	82	44	63.7	2.64	
Pine River	83	35	60.8	2.74	
Portage	85[e]	42[e]	64.1[e]	0.95	
Port Washington	82	44	62.6	2.48	
Prairie du Chien	90	43	65.7	3.72	
Prentice	89	30	60.2	4.48	
Racine	85	47	65.4	2.37	
Sheboygan	82	44	63.6	1.92	
Spooner	85	30	61.0	3.76	

TABLE II.—*Climatological record of cooperative observers. Late reports for August*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Wisconsin—Cont'd.	°	°	°	*Ins.*	*Ins.*
Stanley	83	32	60.8	4.33	
Stevens Point	86	33	61.8	2.34	
Sturgeon Bay Canal	77	37	60.0	4.44	
Tomahawk	85	29	60.8	4.02	
Viroqua	83	43	63.3	3.52	
Watertown	82	39	62.4	1.66	
Waukesha	.....	.....	.....	1.44	
Waupaca	84	36	60.8	2.07	
Wausau	82	34	60.6	3.98	
Whitehall	82	37	61.8	2.41	
Wyoming.					
Alcova	87	33	61.4	1.58	
Barnum	.....	.....	.....	0.65	
Basin	95	22	62.8	0.98	
Bedford	85	20	53.7	2.64	3.0
Border	86	17	53.0	1.00	
Buffalo	89	30	57.9	1.37	T.
Cambria	95	30	63.1	1.24	
Chugwater	91[b]	28[b]	59.8[b]	1.01	
Clark	.....	.....	.....	0.61	
Daniel	78	17	47.8	1.21	3.0
Elk Mountain	.....	.....	.....	1.41	5.5
Embar	90	27	60.6	1.30	
Evanston	85	22	53.6	1.48	3.0
Fayette	85	21	53.6	0.53	
Fort Laramie	97	34	61.8	1.10	
Fort Washakie	90	21	55.6	1.70	
Gillette	91	33	63.4	1.35	4.5
Granite Canyon	83	29	55.2	0.76	
Granite Springs	.....	.....	.....	0.45	
Green River	90	25	57.0	1.39	
Griggs	89	31	57.8	1.20	11.5
Hatton	.....	.....	.....	1.09	
Hyattville	92	30	62.1	.....	.....
Iron Mountain	84	31	56.0	0.91	T.
Jackson	85	14	50.4	1.53	0.5
Kirtley	88	30	59.6	1.06	1.0
Laramie	81	31	55.0	1.64	T.
Leo	82	26	54.8	1.13	3.5
Little Medicine	83	20	51.9	1.34	T.
Lolabama Ranch	79	21	53.2	0.82	2.0
Lusk	88	28	55.8	0.00	
Marquette	87	30	59.3	0.41	
Meeteetse	91	28	58.1	1.07	2.5
Moore	87[f]	30[f]	58.2[f]	1.47	.....
Phillips	89	31	59.8	1.10	
Pine Bluff	95	35	62.6	0.95	
Rambler	72	22	47.0	1.75	5.0
Sheridan	90	32	59.4	1.10	
South Pass City	85	18	50.4	1.23	6.0
Story	88	31[c]	60.4	1.90	6.0
Thayne	87[d]	13[d]	51.7[d]	1.51	T.
Wells	78	17	47.8	1.62	1.0
Wolf	90	32	63.1	1.27	T.
Yellowstone Pk. (Foun'n)	80[b]	25[b]	49.6[b]	.....	.....
Yellowstone Pk. (Lake)	91	16	47.5	0.68	4.5
Yellowstone Pk. (Norris)	84	13	49.0	.....	.....
Yellowstone Pk. (Old F. I)	81	15	50.0	1.58	.....
Yellowstone Pk (Riversde)	83	12	50.2	1.54	13.0
Yellowstone Pk (Snake R)	83	20	49.0	1.11	3.0
Yellowstone Pk. (Soda R.)	83	17	49.4	1.05	2.0
Yellowstone Pk. (Thumb)	79	17	48.9	0.96	7.1
Porto Rico.					
Adjuntas	90	55	72.4	6.99	
Agua Buenos	.....	.....	.....	9.82	
Aguirre	100	70	82.4	6.31	
Arecibo	92	61	76.3	11.50	
Barros	88	59	74.4	6.23	
Bayamon	92	65	78.2	9.10	
Caguas	93	63	78.0	9.60	
Canovanas	93	72	80.8	8.83	
Cidra	98	65	77.7	4.21	
Coamo	92	66	78.7	4.79	
Coloso	98	62	79.2	9.02	
Corozal	91	64	79.8	5.83	
Fajardo	93	70	82.2	7.30	
Hacinda Josefa	.....	.....	.....	7.83	
Humacao	91	74	82.8	16.34	
Ingenio	.....	.....	.....	11.85	
Isabela	93	69	80.2	5.14	
Juana Diaz	95	69	82.8	5.02	
La Carmelita	88	64	75.6	11.87	
La Ysolina	91	64	77.0	10.32	
Lares	92	59	75.8	5.21	
Las Cruces	88	63	73.4	12.41	
Las Marias	91	65	75.5	11.69	
Manati	96	65	80.6	7.25	
Maunabo	95	69	81.7	11.85	
Mayagues	94	65	79.8	8.82	
Ponce	92	69	80.8	6.00	
Rio Piedras	.....	.....	.....	8.18	
San German	95	65	79.8	8.00	
San Lorenzo	101	64	79.4	12.32	
San Salvador	88	61	74.8	7.67	
Santa Isabel	93	67	80.0	5.20	
Vega Baja	95	69	82.6	6.88	
Vieques	94	70	81.6	5.88	
New Brunswick.					
St. John	67	36	54.4	7.68	
West Indies.					
Basseterre, St. Kitts	88	68	80.7	6.31	
Bridgetown, Bar	88	73	80.6	4.22	
Camaguey, Cuba	92	68	79.8	12.05	
Colon, Panama	90	68	78.5	6.36	
Curacao, W. I.	90	75	83.0	0.17	
Kingston, Jamaica	91	69	79.8	1.55	
Port of Spain	90	68	78.0	9.00	
Roseau	91	72	81.5	8.06	
Santiago de Cuba	93	70	81.2	7.64	
Santo Domingo	91	69	79.5	7.13	

Late reports for August, 1905.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alabama.	°	°	°	*Ins.*	*Ins.*
Cedar Bluff	.....	.....	.....	6.00	
Alaska.					
Coal Harbor	70	40	55.7	2.20	
Eagle	84	25	53.4	1.91	
Fairbanks	82	29	54.8	2.71	
Petersburg	80	35	52.2	10.76	
Rampart	96	26	54.4	2.19	
Summit	97	30	55.0	3.74	.....
Tanana	90	32	63.6	2.95	
Arizona.					
Aztec	122	85	98.2	0.30	
California.					
Drytown	102	50	74.5	T.	
Jolin	.....	.....	.....	0.00	
Mojave	95	40	79.3	0.00	
San Miguel Island	.....	.....	.....	0.00	
Westpoint	.....	.....	.....	T.	
Indiana.					
Greenfield	91	54	74.2	5.10	
Kansas.					
Pratt	101	62	79.8	0.99	
Missouri.					
Windsor	99	56	77.1	5.80	
Nebraska.					
Mason City	.....	.....	.....	1.59	
New Hampshire.					
Jefferson Highland	.....	.....	.....	4.72	
New Jersey.					
Elizabeth	92	51	72.2	5.15	
Newton	92	43	67.0	4.44	
New Mexico.					
Arabela	91	51	70.4	1.90	
Ohio.					
Hedges	94	49	71.4	2.59	
Oregon.					
Heisler	97	35	65.5	.....	
Texas.					
Bigsprings	107	60	83.1	2.50	
Wyoming.					
Dubois	.....	.....	.....	0.19	
Fayette	89	32	62.5	0.53	

EXPLANATION OF SIGNS.

• Extremes of temperature from observed readings of dry thermometer.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

[1] Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. ÷ 4.
[2] Mean of 8 a. m. + 8 p. m. ÷ 2.
[3] Mean of 7 a. m. + 7 p. m. ÷ 2.
[4] Mean of 6 a. m. + 6 p. m. ÷ 2.
[5] Mean of 7 a. m. + 2 p. m. ÷ 2.
[6] Mean of readings at various hours reduced to true daily mean by special tables.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An italic letter following the name of a station, as "Livingston *a*," "Livingston *b*," indicates that two or more observers, as the case may be, are reporting from the same station. A small roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance, "[b]" denotes 14 days missing.

No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks of whatever duration, in the precipitation record receive appropriate notice.

CORRECTIONS, JULY, 1905.

Ohio, Cleveland (*b*), make precipitation 4.39 inches instead of 4.79 inches.

TABLE III.—*Resultant winds from observations at 8 a. m. and 8 p. m., daily, during the month of September, 1905.*

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
New England.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Eastport, Me	17	23	6	29	s. 75 w.	24
Portland, Me	15	19	9	26	s. 77 w.	18
Concord, N. H.†	13	8	6	11	n. 45 w.	7
Northfield, Vt	15	37	5	13	s. 20 w.	23
Boston, Mass	15	20	9	28	s. 75 w.	20
Nantucket, Mass	14	25	14	25	s. 45 w.	16
Block Island, R. I	15	26	12	25	s. 50 w.	17
Providence, R. I	20	18	24	24	n.	2
Hartford, Conn	16	28	8	16	s. 34 w.	14
New Haven, Conn	21	17	14	21	n. 60 w.	8
Middle Atlantic States.						
Albany, N. Y	22	25	11	14	s. 45 w.	4
Binghamton, N. Y.†	11	6	13	10	n. 31 e.	6
New York, N. Y	15	21	11	27	s. 69 w.	17
Harrisburg, Pa	17	13	14	24	n. 68 w.	11
Philadelphia, Pa	21	19	14	23	n. 77 w.	9
Scranton, Pa	23	20	13	21	n. 69 w.	8
Atlantic City, N. J	17	23	11	22	s. 6 w.	12
Cape May, N. J	19	23	12	16	s. 45 w.	6
Baltimore, Md	22	21	8	22	n. 86 w.	14
Washington, D. C	22	19	17	17	n.	3
Lynchburg, Va	20	15	23	16	n. 54 e.	9
Mount Weather, Va	19	19	13	28	w.	15
Norfolk, Va	17	27	23	9	s. 54 e.	17
Richmond, Va	22	21	17	9	n. 83 e.	8
Wytheville, Va	20	8	19	24	n. 23 w.	13
South Atlantic States.						
Asheville, N. C	22	21	17	13	n. 76 e.	4
Charlotte, N. C	18	19	35	7	s. 88 e.	28
Hatteras, N. C	21	19	23	14	n. 77 e.	9
Raleigh, N. C	26	17	18	12	n. 34 e.	11
Wilmington, N. C	20	19	27	10	n. 87 e.	17
Charleston, S. C	17	18	27	9	s. 87 e.	18
Columbia, S. C	19	20	28	10	s. 87 e.	18
Augusta, Ga	18	20	25	13	s. 81 e.	12
Savannah, Ga	15	21	20	17	s. 27 e.	7
Jacksonville, Fla	18	15	29	8	n. 82 e.	21
Florida Peninsula.						
Jupiter, Fla	11	20	33	8	s. 70 e.	27
Key West, Fla	12	12	45	3	e.	42
Tampa, Fla	27	5	37	6	n. 55 e.	38
Eastern Gulf States.						
Atlanta, Ga	28	3	21	23	n. 5 w.	25
Macon, Ga.†	15	6	9	5	n. 24 e.	10
Pensacola, Fla.†	21	1	11	4	n. 19 e.	21
Birmingham, Ala.†	12	7	10	7	n. 31 e.	6
Mobile, Ala	26	9	15	21	n. 19 w.	18
Montgomery, Ala	26	7	23	11	n. 32 e.	22
Meridian, Miss.†	11	5	12	8	n. 34 e.	7
Vicksburg, Miss	23	14	28	9	n. 65 e.	21
New Orleans, La	30	12	19	10	n. 27 e.	20
Western Gulf States.						
Shreveport, La	21	18	29	4	n. 83 e.	25
Fort Smith, Ark	9	5	40	9	n. 83 e.	31
Little Rock, Ark	28	13	21	15	n. 22 e.	16
Corpus Christi, Tex	13	26	28	5	s. 61 e.	26
Fort Worth, Tex	12	22	31	8	s. 67 e.	25
Galveston, Tex	15	31	23	4	s. 50 e.	25
Palestine, Tex	20	23	27	6	s. 82 e.	21
San Antonio, Tex	15	22	39	2	s. 80 e.	38
Taylor, Tex.†	10	13	6	2	s. 53 e.	5
Ohio Valley and Tennessee.						
Chattanooga, Tenn	23	20	17	14	n. 45 e.	4
Knoxville, Tenn	31	11	10	17	n. 19 w.	21
Memphis, Tenn	24	16	21	12	n. 48 e.	12
Nashville, Tenn	20	14	18	19	n. 9 w.	6
Lexington, Ky.†	6	14	9	9	s.	8
Louisville, Ky	21	25	11	15	s. 45 w.	6
Evansville, Ind.†	10	10	9	7	e.	2
Indianapolis, Ind	16	23	15	18	s. 23 w.	8
Cincinnati, Ohio	14	21	22	20	s. 16 e.	7
Columbus, Ohio	14	24	22	17	s. 27 e.	11
Pittsburg, Pa	23	17	13	21	n. 53 w.	10
Parkersburg, W. Va	19	18	15	20	n. 79 w.	5
Elkins, W. Va	27	10	7	29	n. 52 w.	28
Lower Lake Region.						
Buffalo, N. Y	10	22	14	27	s. 47 w.	18
Oswego, N. Y	12	32	11	16	s. 14 w.	21
Rochester, N. Y	14	21	12	30	s. 69 w.	19
Syracuse, N. Y	13	29	12	18	s. 21 w.	17
Erie, Pa	10	33	9	19	s. 23 w.	25
Cleveland, Ohio	13	34	18	12	s. 16 e.	22
Sandusky, Ohio†	3	16	4	11	s. 28 w.	15
Toledo, Ohio	12	21	12	23	s. 51 w.	14
Detroit, Mich	16	18	15	23	s. 76 w.	8
Upper Lake Region.						
Alpena, Mich	14	22	12	25	s. 58 w.	15
Escanaba, Mich	18	24	10	17	s. 49 w.	9
Grand Rapids, Mich	14	21	8	16	s. 49 w.	11
Houghton, Mich.†	3	2	14	13	n. 45 e.	1
Marquette, Mich	15	20	14	24	s. 63 w.	11
Port Huron, Mich	14	25	14	17	s. 15 w.	11
Sault Ste. Marie, Mich	14	16	24	21	s. 56 e.	4
Chicago, Ill	12	23	15	24	s. 39 w.	14
Milwaukee, Wis	10	22	10	27	s. 55 w.	21
Green Bay, Wis	9	31	17	19	s. 5 w.	22
Duluth, Minn	25	10	18	22	n. 15 w.	16

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
North Dakota.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Moorhead, Minn	20	26	16	11	s. 40 e.	8
Bismarck, N. Dak	14	16	24	18	s. 72 e.	6
Devils Lake, N. Dak	13	25	21	17	s. 18 e.	13
Williston, N. Dak	18	18	23	16	e.	7
Upper Mississippi Valley.						
Minneapolis, Minn.*	7	17	8	4	s. 22 e.	11
St. Paul, Minn	11	32	17	9	s. 21 e.	22
La Crosse, Wis.†	5	18	3	5	s. 9 w.	13
Madison, Wis	8	30	17	20	s. 8 w.	22
Charles City, Iowa	9	30	21	14	s. 18 e.	22
Davenport, Iowa	15	19	19	21	s. 27 w.	4
Des Moines, Iowa	14	29	17	14	s. 11 e.	15
Dubuque, Iowa	8	28	9	22	s. 33 w.	24
Keokuk, Iowa	12	25	20	19	s. 4 e.	13
Cairo, Ill	26	18	18	11	n. 41 e.	11
La Salle, Ill.†	5	9	14	11	s. 37 e.	5
Peoria, Ill	3	16	11	6	s. 21 e.	14
Springfield, Ill	10	26	18	18	s.	16
Hannibal, Mo.†	4	11	10	11	s. 8 w.	7
St. Louis, Mo	9	25	24	15	s. 29 e.	18
Missouri Valley.						
Columbia, Mo.*	3	13	12	6	s. 31 e.	12
Kansas City, Mo	12	30	26	10	s. 42 e.	24
Springfield, Mo	12	27	24	9	s. 45 e.	21
Topeka, Kans.*	4	14	9	7	s. 11 e.	10
Lincoln, Nebr	10	30	22	10	s. 31 e.	23
Omaha, Nebr	16	32	15	10	s. 17 e.	17
Valentine, Nebr	13	22	17	21	s. 24 w.	10
Sioux City, Iowa†	9	13	9	7	s. 27 e.	4
Pierre, S. Dak	14	27	26	12	s. 47 e.	19
Huron, S. Dak	18	24	27	9	s. 72 e.	19
Yankton, S. Dak.†	7	11	10	7	s. 37 e.	5
Northern Slope.						
Havre, Mont	19	8	13	32	n. 60 w.	22
Miles City, Mont	22	14	22	15	n. 41 e.	11
Helena, Mont	8	16	4	43	s. 79 w.	40
Kalispell, Mont	15	15	2	39	w.	37
Rapid City, S. Dak	11	18	18	26	s. 49 w.	11
Cheyenne, Wyo	17	18	11	28	s. 87 w.	17
Lander, Wyo	11	24	10	31	s. 59 w.	25
Yellowstone Park, Wyo	6	37	1	28	s. 41 w.	41
North Platte, Nebr	11	19	27	15	s. 56 e.	14
Middle Slope.						
Denver, Colo	19	26	12	11	s. 8 e.	7
Pueblo, Colo	18	14	23	21	n. 27 e.	4
Concordia, Kans	9	33	18	8	s. 23 e.	26
Dodge, Kans	8	31	27	10	s. 36 e.	29
Wichita, Kans	13	31	23	9	s. 38 e.	23
Oklahoma, Okla	7	14	18	6	s. 19 e.	36
Southern Slope.						
Abilene, Tex	9	34	22	6	s. 33 e.	30
Amarillo, Tex	6	39	17	10	s. 12 e.	34
Roswell, N. Mex.	14	32	14	16	s. 6 w.	18
Southern Plateau.						
El Paso, Tex	19	8	40	7	n. 72 e.	35
Santa Fe, N. Mex	15	20	27	13	s. 70 e.	15
Flagstaff Ariz	26	9	16	20	n. 13 w.	18
Phoenix, Ariz	11	10	26	20	n. 80 e.	6
Yuma, Ariz	11	19	14	28	s. 60 w.	16
Independence, Cal	22	20	17	21	n. 63 w.	4
Middle Plateau.						
Carson City, Nev	9	28	6	32	s. 54 w.	32
Winnemucca, Nev	19	17	15	27	n. 81 w.	12
Modena, Utah	10	16	12	34	s. 75 w.	23
Salt Lake City, Utah	16	23	24	16	s. 49 e.	11
Durango, Colo	28	7	3	37	n. 59 w.	40
Grand Junction, Colo	19	12	23	20	n. 23 e.	8
Northern Plateau.						
Baker City, Oreg	21	25	11	21	s. 68 w.	11
Boise, Idaho	21	17	16	28	n. 72 w.	13
Lewiston, Idaho†	2	6	23	3	s. 79 e.	20
Pocatello, Idaho	4	26	38	15	s. 46 e.	32
Spokane, Wash	8	31	13	23	s. 23 w.	25
Walla Walla, Wash	2	36	9	15	s. 10 w.	34
North Pacific Coast Region.						
North Head, Wash	16	27	16	16	s.	11
Port Crescent, Wash.*	10	7	6	15	n. 72 w.	10
Seattle, Wash	18	27	14	12	s. 13 e.	9
Tacoma, Wash	20	25	3	26	s. 78 w.	24
Tatoosh Island, Wash	5	30	17	17	s.	25
Portland, Oreg	15	24	11	25	s. 57 w.	17
Roseburg, Oreg	33	9	17	15	n. 5 e.	24
Middle Pacific Coast Region.						
Eureka, Cal	25	18	6	23	n. 68 w.	18
Mount Tamalpais, Cal	26	6	2	43	n. 64 w.	46
Red Bluff, Cal	29	26	6	2	n. 53 e.	5
Sacramento, Cal	8	46	20	10	s. 15 e.	39
San Francisco, Cal	6	13	1	50	s. 82 w.	50
South Pacific Coast Region.						
Fresno, Cal	36	1	1	39	n. 47 w.	52
Los Angeles, Cal	5	13	14	38	s. 72 w.	25
San Diego, Cal	27	8	5	35	n. 58 w.	36
San Luis Obispo, Cal	24	13	6	27	n. 62 w.	24
West Indies						
San Juan, Porto Rico	4	25	39	8	s. 56 e.	37
Grand Turk, W. I	3	6	24	0	s. 83 e.	24
Hamilton, Bermuda	22	21	14	14	n.	1

* From observations at 8 p. m. only. † From observations at 8 a. m. only.

TABLE IV.—*Accumulated amounts of precipitation for each 5 minutes, for storms in which the rate of fall equaled or exceeded 0.25 in any 5 minutes, or 0.75 in 1 hour during September, 1905, at all stations furnished with self-registering gages.*

Stations.	Date.	Total duration. From—	Total duration. To—	Total amount of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	Depths of precipitation (in inches) during periods of time indicated. 5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Albany, N. Y.	20			0.66						0.36											
Alpena, Mich.	2–3			0.83														0.29			
Amarillo, Tex.	7	1:05 p. m.	3:00 p. m.	0.81	1:07 p. m.	1:25 p. m.	0.01	0.25	0.48	0.63	0.70										
Asheville, N. C.	2	1:15 p. m.	2:45 p. m.	0.76	1:21 p. m.	1:44 p. m.	0.01	0.06	0.13	0.27	0.60	0.67									
Atlanta, Ga.	30	5:12 p. m.	D. N.	1.70	6:04 p. m.	6:49 p. m.	0.02	0.12	0.28	0.31	0.33	0.41	0.55	0.76	0.93	1.00					
Atlantic City, N. J.	11–12			0.77														0.43			
Augusta, Ga.	12			0.44														0.20			
Baltimore, Md.	2–3			1.24														0.45			
Binghamton, N. Y.	17–18			0.67														0.31			
Birmingham, Ala.	1–2			0.46														0.19			
Bismarck, N. Dak.	14			0.27														0.22			
Block Island, R. I.	3–4			2.65														0.67			
Boise, Idaho.	27–28			0.18														0.03			
Boston, Mass.	3–4			4.61														*			
Buffalo, N. Y.	11			0.61														0.29			
Cairo, Ill.	7			0.21														0.18			
Charles City, Iowa.	14			0.48														0.39			
Charleston, S. C.	6			0.48														0.41			
Charlotte, N. C.	17			2.32														0.67			
Chattanooga, Tenn.	3			0.62														0.45			
Cheyenne, Wyo.	5			0.23														0.22			
Chicago, Ill.	1	6:45 p. m.	10:15 p. m.	1.56	8:23 p. m.	9:26 p. m.	0.03	0.15	0.30	0.49	0.65	0.81	0.89	0.97	1.08	1.21	1.28	1.47			
Do	18	4:10 a. m.	6:10 a. m.	0.87	5:13 a. m.	5:38 a. m.	0.02	0.19	0.47	0.60	0.61	0.82									
Cincinnati, Ohio.	17			0.52						0.47											
Cleveland, Ohio.	2			0.66														0.51			
Columbia, Mo.	†16–17	4:12 a. m.	5:16 a. m.	0.15	4:21 a. m.	5:00 a. m.	0.02	0.16	0.30	0.67	1.07	1.20	1.28	1.36	1.42						
Do.	18	7:09 p. m.	11:10 p. m.	1.73	7:14 p. m.	8:22 p. m.	0.01	0.06	0.23	0.28	0.35	0.49	0.60	0.74	0.82	0.91	0.94	1.14	1.18		
Columbia, S. C.	12			0.55						0.42											
Columbus, Ohio.	15–16			1.29														0.44			
Concord, N. H.	2–3			2.59														0.23			
Corpus Christi, Tex.	20	5:34 a. m.	7:22 a. m.	1.79	5:44 a. m.	6:29 a. m.	0.01	0.13	0.38	0.57	0.84	1.12	1.31	1.53	1.56	1.61					
Do	20	8:16 a. m.	1:22 p. m.	1.14	8:53 a. m.	9:18 a. m.	0.20	0.16	0.42	0.47	0.60	0.65									
Davenport, Iowa.	1	6:55 p. m.	D. N.	2.72	10:23 p. m.	10:56 p. m.	1.05	0.33	0.64	0.91	1.05	1.10	1.25	1.33							
Denver, Colo.	18			0.28														0.20			
Des Moines, Iowa.	14	8:20 a. m.	10:00 a. m.	0.81	8:27 a. m.	9:01 a. m.	0.03	0.26	0.30	0.38	0.53	0.58	0.64	0.67							
Detroit, Mich.	15	1:50 p. m.	2:55 p. m.	1.35	2:00 p. m.	2:17 p. m.	0.05	0.21	0.69	0.93	1.06										
Dodge, Kans.	4–5			1.05														0.25			
Dubuque, Iowa.	18			0.57														0.51			
Duluth, Minn.	1	12:00 mid.	6:00 a. m.	1.28	12:21 a. m.	1:00 a. m.	0.05	0.08	0.13	0.22	0.40	0.54	0.66	0.75	0.82						
Do	16	6:55 a. m.	8:15 a. m.	0.54	7:50 a. m.	8:08 a. m.	0.03	0.21	0.27	0.47	0.50										
Eastport, Me.	12–13			1.18														0.39			
Elkins, W. Va.	4			0.45						0.41											
Erie, Pa.	15			0.91					0.30												
Escanaba, Mich.	1–2			1.26														0.49			
Evansville, Ind.	1	1:25 p. m.	5:20 p. m.	1.20	1:38 p. m.	2:08 p. m.	T.	0.19	0.47	0.63	0.74	0.80	0.85								
Fort Smith, Ark.	18–19			1.03														0.66			
Fort Worth, Tex.	11			0.52						0.49											
Galveston, Tex.	5			1.24					0.36												
Grand Rapids, Mich.	16	2:16 p. m.	6:20 p. m.	1.67	4:25 p. m.	5:33 p. m.	0.40	0.22	0.36	0.47	0.61	0.62	0.62	0.62	0.62	0.62	0.69	1.07	1.26		
Green Bay, Wis.	18			0.31				0.30													
Hannibal, Mo.	2	D. N.	D. N.	1.11	1:14 a. m.	1:29 a. m.	0.07	0.28	0.69	0.83											
Do	12	8:28 p. m.	D. N.	1.36	8:29 p. m.	10:04 p. m.	0.01	0.11	0.18	0.28	0.33	0.38	0.46	0.49	0.52	0.54	0.57	0.64	0.99	1.15	
Harrisburg, Pa.	4	D. N.	7:15 a. m.	0.63	5:56 a. m.	6:17 a. m.	0.07	0.07	0.24	0.38	0.47										
Hartford, Conn.	2–3			1.25														0.42			
Hatteras, N. C.	16	9:35 a. m.	10:20 a. m.	0.52	9:41 a. m.	10:06 a. m.	0.01	0.09	0.26	0.38	0.45	0.51									
Huron, S. Dak.	16	11:17 a. m.	1:35 p. m.	0.66	11:26 a. m.	11:40 a. m.	0.02	0.23	0.37	0.44											
Indianapolis, Ind.	15			0.70														0.40			
Iola, Kans.	15	2:55 a. m.	6:40 a. m.	2.19	3:15 a. m.	4:30 a. m.	0.02	0.12	0.22	0.37	0.51	0.70	0.93	1.21	1.33	1.45	1.55	1.77	1.99		
Jacksonville, Fla.	29	8:26 a. m.	10:35 a. m.	0.72	8:36 a. m.	9:06 a. m.	0.04	0.07	0.20	0.27	0.36	0.48	0.62								
Jupiter, Fla.	25	1:32 p. m.	6:15 p. m.	2.09	4:14 p. m.	5:14 p. m.	0.36	0.22	0.25	0.44	0.74	0.91	1.09	1.29	1.46	1.51	1.54	1.67			
Kansas City, Mo.	14–15	11:50 p. m.	8:20 a. m.	2.63	11:55 p. m.	12:46 a. m.	0.01	0.09	0.20	0.33	0.61	0.96	1.18	1.42	1.72	1.92	2.09				
Do	16	2:20 a. m.	12:05 p. m.	2.50	2:26 a. m.	3:10 a. m.	0.02	0.11	0.25	0.44	0.76	0.89	0.99	1.04	1.09	1.14					
Key West, Fla.	9	10:20 a. m.	12:55 p. m.	1.07	11:05 a. m.	11:35 a. m.	0.16	0.14	0.41	0.58	0.70	0.77	0.89								
Do	21	11:20 a. m.	12:20 p. m.	1.00	11:35 a. m.	12:00 m.	0.01	0.08	0.38	0.62	0.86	0.97									
Do	29	12:01 a. m.	5:30 a. m.	1.79	4:06 a. m.	5:06 a. m.	0.32	0.06	0.17	0.30	0.58	0.84	1.06	1.11	1.14	1.17	1.22	1.44			
Knoxville, Tenn.	10–11			0.24														0.17			
La Crosse, Wis.	18	6:58 p. m.	10:15 p. m.	1.15	7:00 p. m.	7:20 p. m.	0.01	0.25	0.40	0.49	0.60										
La Salle, Ill.	1–2	7:46 p. m.	8:40 a. m.	2.14	§12:34 a. m.	12:55 a. m.	0.04	0.20	0.70	0.92	0.99										
					‖ 3:01 a. m.	3:55 a. m.	1.12	0.11	0.21	0.32	0.44	0.52	0.52	0.55	0.68	0.72	0.79	0.86			
Lexington, Ky.	1	10:15 a. m.	11:10 a. m.	0.97	10:26 a. m.	10:57 a. m.	0.04	0.09	0.34	0.50	0.62	0.73	0.90								
Lincoln, Nebr.	15–16	7:05 p. m.	9:15 a. m.	2.31	10:18 p. m.	11:03 p. m.	0.19	0.09	0.10	0.25	0.39	0.44	0.49	0.69	0.82	0.99					
Do	18	2:00 a. m.	7:15 a. m.	1.34	3:20 a. m.	3:45 a. m.	0.12	0.14	0.34	0.59	0.69	0.75									
Little Rock, Ark.	30			0.20														0.16			
Los Angeles, Cal.	22			T.																	
Louisville, Ky.	1	3:19 p. m.	6:10 p. m.	0.81	3:22 p. m.	3:43 p. m.	0.01	0.14	0.38	0.55	0.65										
Lynchburg, Va.	1–2			1.34														0.27			
Macon, Ga.	2	2:24 p. m.	3:20 p. m.	0.77	2:24 p. m.	2:47 p. m.	0.00	0.11	0.22	0.54	0.71										
Madison, Wis.	1–2			0.50														0.29			
Memphis, Tenn.	29			0.74														0.48			
Meridian, Miss.	11	1:36 p. m.	2:30 p. m.	1.00	1:42 p. m.	2:26 p. m.	0.01	0.12	0.16	0.26	0.44	0.63	0.69	0.83	0.92	0.97					
Milwaukee, Wis.	1			0.20						0.20											
Minneapolis, Minn.	18	4:15 p. m.	D. N.	3.09	§ 5:57 p. m.	7:08 p. m.	0.24	0.10	0.23	0.28	0.31	0.34	0.47	0.61	0.74	0.88	1.04	1.39	1.76		
					‖ 7:50 p. m.	8:42 p. m.	2.25	0.10	0.15	0.19	0.23	0.26	0.31	0.46	0.53	0.61	0.74	0.81			
Montgomery, Ala.	11	4:50 p. m.	6:00 p. m.	1.43	4:50 p. m.	5:35 p. m.	0.00	0.18	0.45	0.69	0.84	0.93	1.06	1.24	1.31	1.38					
Mount Weather, Va.	*																				
Nantucket, Mass.	3–4	8:20 p. m.	5:10 p. m.	2.56	3:05 p. m.	3:35 p. m.	0.92	0.10	0.20	0.33	0.52	0.66	0.78								
Nashville, Tenn.	9	3:40 p. m.	5:15 p. m.	0.84	4:12 p. m.	4:32 p. m.	0.04	0.14	0.34	0.54	0.67										
Do	10	4:15 p. m.	6:55 p. m.	1.13	4:18 p. m.	4:37 p. m.	0.01	0.44	0.67	0.83	0.91										
New Haven, Conn.	4			0.85														0.51			
New Orleans, La.	6	1:48 p. m.	4:15 p. m.	1.71	2:58 p. m.	3:41 p. m.	0.15	‡0.10	‡0.35	‡0.58	‡0.84	1.03	1.15	1.32	1.45	1.53					
Do	30	1:12 p. m.	3:30 p. m.	2.57	1:14 p. m.	1:48 p. m.	0.01	0.29	0.78	1.38	1.97	2.23	2.37	2.45							
New York, N. Y.	2–3	5:50 p. m.	11:22 a. m.	3.57	§ 5:40 a. m.	6:40 a. m.	0.74	0.05	0.12	0.20	0.31	0.34	0.40	0.49	0.58	0.70	0.81	0.99			
					‖ 8:29 a. m.	9:00 a. m.	2.49	0.07	0.17	0.30	0.33	0.53	0.60								
Norfolk, Va.	3	2:02 p. m.	5:25 p. m.	1.50	3:00 p. m.	3:32 p. m.	0.12	0.24	0.29	0.58	0.85	1.07	1.21								
Northfield, Vt.	20			0.53														0.51			
North Head, Wash.	28			0.55														0.41			
Oklahoma, Okla.	7–8			1.09														0.54			
Omaha, Nebr.	13	1:55 a. m.	6:10 a. m.	1.11	4:00 a. m.	4:33 a. m.	0.26	0.05	0.13	0.29	0.47	0.62	0.71	0.74							
Palestine, Tex.	19			0.26														0.25			
Parkersburg, W. Va.	2	5:35 a. m.	10:30 a. m.	1.67	5:39 a. m.	6:33 a. m.	0.01	0.12	0.18	0.20	0.21	0.35	0.45	0.61	0.66	0.68	0.75	0.85			

TABLE IV.—*Accumulated amounts of precipitation for each 5 minutes, etc.*—Continued.

Stations.	Date.	Total duration. From—	Total duration. To—	Total amount of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	Depths of precipitation (in inches) during periods of time indicated. 5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Pensacola, Fla	9–10	6:55 p. m.	12:30 a. m.	2.23	8:14 p. m.	8:48 p. m.	0.01	0.17	0.46	0.73	0.89	1.01	1.07	1.12	.....	.....	.....	.....	.....	.....	.....
					10:01 p. m.	10:21 p. m.	1.19	0.29	0.51	0.72	0.79	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	27–28	9:30 a. m.	11:20 p. m.	3.47	5:11 p. m.	6:18 p. m.	2.29	0.10	0.25	0.35	0.48	0.59	0.66	0.68	0.73	0.79	0.86	0.97	1.12	.....	.....
Peoria, Ill	2	.....	.....	0.49	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.26	.....	.....	.....
Philadelphia, Pa	4	.....	.....	1.10	.....	.....	.....	.....	.....	0.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburg, Pa	15–16	.....	.....	0.51	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.37	.....	.....	.....
Portland, Me	2–3	.....	.....	2.56	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.32	.....	.....	.....
Portland, Oreg	11–12	.....	.....	0.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.24	.....	.....	.....
Pueblo, Colo	14	.....	.....	0.19	.....	.....	.....	.....	0.18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Raleigh, N. C	2	.....	.....	0.28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.20	.....	.....	.....
Richmond, Va	2	D. N.	9:20 a. m.	1.11	5:07 a. m.	5:32 a. m.	0.39	0.17	0.31	0.36	0.49	0.57	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rochester, N. Y	17–18	.....	.....	0.23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.17	.....	.....	.....
Sacramento, Cal	27	.....	.....	0.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo	16–17	.....	.....	3.22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.69	.....	.....	.....
St. Paul, Minn	18–19	.....	.....	1.59	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.50	.....	.....	.....
Salt Lake City, Utah	28–29	.....	.....	1.63	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.22	.....	.....	.....
San Antonio, Tex	1	1:26 p. m.	4:00 p. m.	1.64	3:09 p. m.	3:34 p. m.	0.48	0.14	0.48	0.79	0.94	1.07	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Diego, Cal	22	.....	.....	0.34	.....	.....	.....	.....	.....	.....	.....	.....	0.29	.....	.....	.....	.....	.....	.....	.....	.....
Sandusky, Ohio	10–11	.....	.....	0.96	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.21	.....	.....	.....
San Francisco, Cal	10	.....	.....	T.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Savannah, Ga	13	2:37 p. m.	4:15 p. m.	1.10	3:01 p. m.	3:26 p. m.	0.04	0.22	0.42	0.67	0.87	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	21	5:59 p. m.	8:25 p. m.	1.21	6:59 p. m.	7:34 p. m.	0.02	0.05	0.23	0.45	0.69	0.91	1.09	1.14	.....	.....	.....	.....	.....	.....	.....
Scranton, Pa	4	D. N.	9:20 a. m.	1.33	5:10 a. m.	5:35 a. m.	0.41	0.11	0.39	0.53	0.58	0.65	.....	.....	.....	.....	.....	.....	.....	.....	.....
Seattle, Wash	19	.....	.....	0.26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.18	.....	.....	.....
Shreveport, La	11	.....	.....	0.44	.....	.....	.....	.....	.....	.....	.....	.....	0.38	.....	.....	.....	.....	.....	.....	.....	.....
Spokane, Wash	12–13	.....	.....	0.24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.08	.....	.....	.....
Springfield, Ill	10	11:28 a. m.	12:22 p. m.	0.60	11:33 a. m.	12:00 m.	0.01	0.09	0.14	0.35	0.41	0.57	.....	.....	.....	.....	.....	.....	.....	.....	.....
Springfield, Mo	12	12:30 p. m.	4:50 p. m.	0.82	12:43 p. m.	1:10 p. m.	0.05	0.08	0.17	0.33	0.46	0.54	.....	.....	.....	.....	.....	.....	.....	.....	.....
Syracuse, N. Y	3	2:41 p. m.	3:58 p. m.	0.51	2:52 p. m.	3:12 p. m.	0.01	0.22	0.29	0.37	0.47	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tampa, Fla	12–13	6:40 p. m.	5:30 a. m.	1.29	6:47 p. m.	7:32 p. m.	0.01	0.15	0.38	0.59	0.67	0.83	0.93	0.99	1.03	1.10	.....	.....	.....	.....	.....
Taylor, Tex	19	.....	.....	0.22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.19	.....	.....	.....
Toledo, Ohio	15	4:25 p. m.	5:30 p. m.	0.71	4:49 p. m.	5:09 p. m.	0.08	0.10	0.28	0.47	0.62	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Topeka, Kans	15	12:02 a. m.	6:55 a. m.	3.89	12:36 a. m.	1:26 a. m.	0.12	0.13	0.29	0.40	0.50	0.61	0.72	0.93	1.05	1.15	1.23	.....	.....	.....	.....
					1:26 a. m.	2:16 a. m.	.....	1.36	1.59	1.79	1.95	2.17	2.26	2.38	2.49	2.57	2.60	.....	.....	.....	.....
					2:16 a. m.	2:54 a. m.	.....	2.76	2.94	3.06	3.19	3.31	3.35	3.42	.....	.....	.....	.....	.....	.....	.....
Valentine, Nebr	8	.....	.....	0.82	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.44	.....	.....	.....
Vicksburg, Miss	11–12	8:04 p. m.	D. N.	1.38	8:21 p. m.	9:06 p. m.	0.08	0.06	0.15	0.22	0.38	0.56	0.68	0.83	0.98	1.06	.....	.....	.....	.....	.....
Washington, D. C	2	.....	.....	0.48	.....	.....	.....	.....	.....	.....	0.45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wichita, Kans	15	7:40 a. m.	9:20 a. m.	0.85	8:05 a. m.	8:30 a. m.	0.07	0.12	0.27	0.59	0.65	0.70	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	17	7:07 p. m.	9:30 p. m.	2.95	8:25 p. m.	9:17 p. m.	0.31	0.23	0.36	0.41	0.82	1.32	1.66	1.84	1.97	2.17	2.59	.....	.....	.....	.....
Williston, N. Dak	13–14	.....	.....	0.52	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.28	.....	.....	.....
Wilmington, N. C	16–17	.....	.....	1.32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.36	.....	.....	.....
Wytheville, Va	3–4	.....	.....	0.52	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.25	.....	.....	.....
Yankton, S. Dak	14	.....	.....	0.62	.....	.....	.....	.....	.....	0.42	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Camaguey, Cuba	22–23	3:30 p. m.	D. N.	3.76	5:50 p. m.	7:12 p. m.	0.19	0.11	0.25	0.34	0.39	0.49	0.58	0.80	1.12	1.45	1.73	2.19	2.79	.....	.....
Do	28–29	4:45 p. m.	D. N.	4.40	6:37 p. m.	8:08 p. m.	0.28	0.13	0.38	0.60	0.82	0.99	1.21	1.47	1.85	2.19	2.42	3.14	3.91	4.09	.....
San Juan, Porto Rico	12	1:19 p. m.	10:00 p. m.	2.10	2:31 p. m.	2:59 p. m.	0.44	0.08	0.21	0.35	0.43	0.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
					3:36 p. m.	3:59 p. m.	1.08	0.10	0.24	0.38	0.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	29	2:20 p. m.	4:10 p. m.	0.74	2:23 p. m.	2:47 p. m.	0.01	0.16	0.31	0.49	0.57	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

• Self-register not working † Record defective; during greater part of time precipitation was excessive. ‡ Estimated. ⁂ 28th.

TABLE V.—*Data furnished by the Canadian Meteorological Service, September, 1905.*

Stations.	Pressure, in inches. Actual, reduced to mean of 24 hours.	Pressure, in inches. Sea level, reduced to mean of 24 hours.	Pressure, in inches. Departure from normal.	Temperature. Mean.	Temperature. Departure from normal.	Temperature. Mean maximum.	Temperature. Mean minimum.	Precipitation. Total.	Precipitation. Departure from normal.	Precipitation. Total snowfall.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	*Ins.*	*Ins.*	*Ins.*
St. Johns, N. F	29.83	29.97	.00	51.9	— 2.1	59.3	44.5	2.73	—0.98	
Sydney, C. B. I	29.97	30.01	.00	54.2	— 2.3	62.4	45.9	3.86	+0.58	
Halifax, N. S	29.93	30.04	.00	56.6	— 1.0	64.2	49.0	2.76	—0.95	
Grand Manan, N. B	29.95	30.00	—.03	55.3	— 0.8	61.5	49.1	5.90	+2.73	
Yarmouth, N. S	29.98	30.05	.00	54.5	— 1.6	60.7	48.3	4.88	+1.43	
Charlottetown, P. E. I	29.96	30.00	—.01	57.1	— 0.2	63.2	51.0	4.82	+1.43	
Chatham, N. B	29.98	30.00	.00	57.4	+ 2.0	67.3	47.6	5.44	+2.73	
Father Point, Que	29.95	29.97	—.01	50.0	— 0.4	56.5	43.5	4.47	+1.34	
Quebec, Que	29.68	30.00	—.01	54.6	— 0.5	61.6	47.6	4.66	+0.99	
Montreal, Que	29.80	30.00	—.04	58.9	+ 0.5	64.7	53.0	3.57	+0.27	
Rockliffe, Ont	29.40	30.00	—.03	58.6	+ 2.9	69.4	47.9	4.58	+1.30	
Ottawa, Ont	29.67	29.99	—.05	59.8	+ 2.4	68.4	51.3	2.35	—0.34	
Kingston, Ont	29.73	30.04	.00	60.6	+ 0.6	68.5	52.8	1.90	—0.90	
Toronto, Ont	29.66	30.03	—.03	62.3	+ 3.3	71.5	53.1	1.73	—1.52	
White River, Ont	28.67	29.97	—.01	54.2	+ 3.9	64.6	43.8	2.86	+0.09	
Port Stanley, Ont	29.41	30.05	—.01	60.8	+ 1.3	70.4	51.3	1.06	—1.67	
Saugeen, Ont	29.33	30.03	—.02	61.1	+ 3.6	69.4	52.8	2.56	—0.38	
Parry Sound, Ont	29.28	30.01	—.02	60.4	+ 4.4	69.5	51.2	5.78	+2.11	
Port Arthur, Ont	29.27	29.98	.00	54.6	+ 2.4	63.0	46.2	4.58	+1.10	
Winnipeg, Man	29.08	29.90	—.04	58.6	+ 6.1	70.8	46.3	1.56	—0.47	
Minnedosa, Man	28.10	29.90	—.04	55.3	+ 4.8	68.3	42.4	2.42	+1.06	
Qu'Appelle, Assin	27.65	29.88	—.04	53.8	+ 2.7	65.7	41.8	4.61	+3.28	
Medicine Hat, Assin	27.60	29.86	—.06	59.8	+ 4.8	72.9	46.6	0.16	—1.02	
Swift Current, Assin	27.34	29.88	—.04	55.4	+ 2.3	68.4	43.4	1.12	—0.10	
Calgary, Alberta	26.35	29.85	—.07	51.5	+ 1.7	66.5	36.6	0.35	—1.01	
Banff, Alberta	25.33	29.87	—.06	48.9	+ 3.1	59.4	38.3	1.72	+0.05	
Edmonton, Alberta	27.55	29.83	—.07	51.8	+ 2.5	64.7	38.9	1.68	+0.35	
Prince Albert, Sask	28.28	29.83	—.07	49.4	+ 1.0	59.6	39.2	2.29	+1.01	
Battleford, Sask	28.16	29.89	—.01	53.5	+ 1.7	65.9	41.0	0.70	—0.55	
Kamloops, B. C	28.64	29.85	—.12	57.5	+ 0.1	66.9	48.1	1.54	+0.69	
Victoria, B. C	29.88	29.98	—.03	56.3	+ 1.5	61.5	51.2	4.03	+1.87	
Barkerville, B. C	25.61	29.89	—.09	45.0	— 1.7	56.2	33.9	2.08	—0.83	T.
Hamilton, Bermuda	29.93	30.09	+.02	77.8	+ 0.4	83.3	72.2	2.52	—3.99	
Dawson, Yukon	28.57	.....	.....	39.5	.....	45.7	33.3	3.52	.....	9.2

TABLE VI.—*Heights of rivers referred to zeros of gages, September, 1905.*

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Milk River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Havre, Mont.	237	9	2.4	1-8	2.2	19-30	2.3	0.2
Musselshell River.								
Musselshell, Mont.	87	9	0.1	16-19	0.0	{1-15, 20-30}	0.0	0.1
Yellowstone River.								
Billings, Mont.	330	8	1.0	1-3	0.5	22-29	0.7	0.5
Glendive, Mont.	78	17	2.4	5	1.2	28-30	1.8	1.2
Cheyenne River.								
Rousseau, S. Dak.	7	9	3.0	5	0.0	25-30	0.7	3.0
James River.								
Lamoure, N. Dak.	330	14	0.1	1	— 0.8	28-30	—0.4	0.9
Huron, S. Dak.	139	9	0.2	1	— 0.3	16	—0.1	0.5
Republican River.								
Clay Center, Kans.	42	18	7.5	9	6.6	20-25	6.9	0.9
Smoky Hill River.								
Abilene, Kans.	45	22	2.3	11	1.4	{23, 24, 26-30}	1.7	0.9
Kansas River.								
Manhattan, Kans.	116	18	11.6	17	3.4	3	5.0	8.2
Topeka, Kans.	87	21	14.2	17	6.9	12, 14	8.6	7.3
Missouri River.								
Townsend, Mont.	2,504	11	3.1	17,18,23-27	2.9	{1-9, 13-15, 19, 20}	3.0	0.2
Fort Benton, Mont.	2,285	12	0.1	1-8	0.0	9-30	0.0	0.1
Wolfpoint, Mont.	1,952	17	— 2.0	14	— 2.5	30	—2.2	0.5
Bismarck, N. Dak.	1,309	14	0.9	1	— 0.8	30	0.1	1.7
Pierre, S. Dak.	1,114	14						
Sioux City, Iowa	784	19	6.3	19	4.3	29, 30	5.1	2.0
Blair, Nebr.	705	15	6.4	21	5.0	12	5.6	1.4
Omaha, Nebr.	669	18	6.3	21	4.3	8	4.8	3.0
St. Joseph, Mo.	481	10	7.0	22	1.9	11-13	3.7	5.1
Kansas City, Mo.	388	21	18.9	18	7.0	13	10.9	11.9
Glasgow, Mo.	231	18	17.5	20	5.5	11	9.5	12.0
Boonville, Mo.	199	20	22.0	20	7.9	9	12.4	14.1
Hermann, Mo.	103	24	25.7	19	8.1	9	14.3	17.6
Minnesota River.								
Mankato, Minn.	127	18	4.4	19	2.6	14	3.0	1.8
St. Croix River.								
Stillwater, Minn.	23	11	10.0	23-25	5.8	14	7.2	4.2
Chippewa River.								
Chippewa Falls, Wis.	75	16	7.5	21	1.6	11	3.2	5.9
Red Cedar River.								
Cedar Rapids, Iowa	77	14	3.6	20, 21	3.2	{7-18, 27, 29, 30}	3.3	0.4
Iowa River.								
Iowa City, Iowa.	57		0.4	22, 23	— 1.1	14	—0.6	1.5
Des Moines River.								
Des Moines, Iowa.	205	19	4.3	29, 30	2.7	14	3.2	1.6
Illinois River.								
La Salle, Ill.	197	18	14.7	4	11.8	1, 30	12.9	2.9
Peoria, Ill.	135	14	9.9	10, 11	8.2	1, 2	9.2	1.7
Red Bank Creek.								
Brookville, Pa.	42	8	1.6	12	— 0.4	27-30	0.2	2.0
Clarion River.								
Clarion, Pa.	32	10	6.4	12	0.3	10	1.8	6.1
Conemaugh River.								
Johnstown, Pa.	64	7	5.1	12	1.2	29, 30	2.3	3.9
Kiskiminetas River.								
Saltsburg, Pa (1).	22	6	5.0	12	— 1.0	30	0.4	6.0
Allegheny River.								
Warren, Pa.	177	14	0.5	14	— 0.5	30	—0.1	1.0
Franklin, Pa.	114	15	2.2	12	0.3	7-10	1.0	1.9
Parker, Pa.	73	20	3.2	12	0.7	10, 30	1.4	2.5
Freeport, Pa.	29	20	9.9	12	1.7	10	3.7	8.2
Springdale, Pa.	17	27	13.3	12	6.2	9, 10	7.8	7.1
Cheat River.								
Rowlesburg, W. Va.	86	14	2.8	13	0.4	30	1.4	2.4
Youghiogheny River.								
Confluence, Pa.	59	10	4.4	11	— 0.1	29, 30	0.7	4.5
West Newton, Pa.	15	23	4.9	12	0.0	28-30	1.0	4.9
Monongahela River.								
Weston, W. Va.	161	18	0.0	13	— 0.8	29, 30	—0.4	0.8
Fairmont, W. Va.	119	25	15.5	12	13.9	8-10	14.2	1.6
Greensboro, Pa.	81	18	8.3	13	6.1	30	6.7	2.2
Lock No. 4, Pa.	40	28	9.9	14	5.9	10	7.5	4.0
Beaver River.								
Ellwood Junction, Pa.	10	14	2.8	12	0.4	10	1.6	2.4
Muskingum River.								
Zanesville, Ohio.	70	25	11.7	22	7.7	10	9.0	4.0
Beverly, Ohio.	20	25	9.4	21	4.1	10, 11	5.7	5.3
Little Kanawha River.								
Glenville, W. Va.	77	20	1.6	3	— 1.8	30	0.0	3.4
Creston, W. Va.	38	20	3.9	1, 2	— 0.6	30	2.0	4.5
New River.								
Radford, Va.	155	14	4.0	5	0.4	28-30	1.1	3.6
Hinton, W. Va.	95	14	4.3	5	1.4	28-30	2.0	2.9
Great Kanawha River.								
Charleston, W. Va.	58	30	8.5	4	6.6	2	7.1	1.9
Scioto River.								
Columbus, Ohio.	110	17	8.3	16	1.3	8-10	3.5	7.0
Licking River.								
Falmouth, Ky.	30	25	2.0	20	0.5	{10, 11, 19, 28-30}	0.8	1.5
Miami River.								
Dayton, Ohio.	77	18	5.1	19	0.9	10	2.4	4.2
Kentucky River.								
Jackson, Ky.	287	24	5.5	1-6	5.0	13-30	5.1	0.5
Beattyville, Ky.	254	30	1.6	14	0.3	24-30	0.7	1.3
High Bridge, Ky.	117	17	11.0	5	9.0	29, 30	9.7	2.0
Frankfort, Ky.	65	31	7.3	5	5.4	29, 30	6.2	1.9
Wabash River.								
Mount Carmel, Ill.	75	15	4.9	23	3.1	13, 30	4.0	1.8

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Cumberland River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Burnside, Ky.	518	50	5.0	3	0.9	28-30	1.6	4.1
Celina, Tenn.	383	45	5.7	5	1.1	29, 30	2.4	4.6
Carthage, Tenn.	308	40	2.8	13	0.9	30	2.0	1.9
Nashville, Tenn.	193	40	10.0	12	7.3	30	8.4	2.7
Clarksville, Tenn.	126	42	9.7	14	2.6	30	5.5	7.1
Powell River.								
Tazewell, Tenn.	44	20	1.9	5	0.4	21, 23-30	0.7	1.5
Clinch River.								
Speers Ferry, Va.	156	20	1.0	3	— 0.9	29	—0.3	1.9
Clinton, Tenn.	52	25	6.0	5	2.6	29, 30	3.9	3.4
South Fork Holston River.								
Bluff City, Tenn.	35	15	3.2	5	0.3	26-30	0.8	2.9
Holston River.								
Rogersville, Tenn.	103	14	3.1	6	1.5	30	2.0	1.6
French Broad River.								
Asheville, N. C.	144	6	0.8	3	— 0.5	27-30	—0.2	1.3
Leadvale, Tenn.	70	15	0.0	3-11	— 2.6	29, 30	—1.2	2.6
Little Tennessee River.								
McGhee, Tenn.	17	20	3.6	2	2.3	25-30	2.7	1.3
Hiwassee River.								
Charleston, Tenn.	18	22	1.9	2, 13	0.8	29, 30	1.4	1.1
Tennessee River.								
Knoxville, Tenn.	635	29	2.4	3	0.4	30	1.2	2.0
Loudon, Tenn.	590	25	2.2	4	0.6	30	1.2	1.6
Kingston, Tenn.	556	25	2.5	4	0.9	30	1.6	1.6
Chattanooga, Tenn.	452	33	3.5	3, 5, 6	1.4	29, 30	2.5	2.1
Bridgeport, Ala.	402	24	2.6	1	0.4	30	1.3	2.2
Guntersville, Ala.	349	31	4.7	1	1.5	28-30	2.9	3.2
Florence, Ala.	255	16	3.8	4	0.0	30	1.3	3.8
Riverton, Ala.	225	26	7.0	4	1.3	30	3.2	5.7
Johnsonville, Tenn.	95	21	5.4	6	1.0	29, 30	2.9	4.4
Ohio River.								
Pittsburg, Pa.	966	22	6.7	11	3.6	16	5.7	3.1
Davis Island Dam, Pa.	960	25	8.8	12	2.5	10	4.0	6.3
Beaver Dam, Pa.	925	27	11.5	13	3.0	10	5.3	8.5
Wheeling, W. Va.	875	36	10.9	13	2.8	11	4.9	8.1
Parkersburg, W. Va.	785	36	10.5	15	3.0	10-12	5.6	7.5
Point Pleasant, W. Va.	703	39	9.5	16	2.5	13	4.9	7.0
Huntington, W. Va.	660	50	13.1	16	5.4	14	8.2	7.7
Catlettsburg, Ky.	651	50	12.0	16	3.5	14	6.7	8.5
Portsmouth, Ohio.	612	50	13.0	17	5.0	13	8.3	8.0
Maysville, Ky.	559	50	12.3	18	4.9	14	8.2	7.4
Cincinnati, Ohio.	499	50	14.2	19, 20	6.8	15, 16	10.2	7.4
Madison, Ind.	413	46	12.2	20, 21	6.5	17	9.0	5.7
Louisville, Ky.	367	28	6.3	21	3.4	17	4.6	2.9
Evansville, Ind.	184	35	9.5	24	4.9	20	7.2	4.6
Mount Vernon, Ind.	148	35	8.9	24, 25	4.3	20	6.7	4.6
Paducah, Ky.	47	40	15.3	25	5.4	18, 19	8.8	9.9
Cairo, Ill.	1	45	39.0	24	13.9	13	19.8	16.1
St. Francis River.								
Marked Tree, Ark.	104	17	10.3	1	5.2	30	8.2	5.1
Neosho River.								
Neosho Rapids, Kans.	326	22	14.3	20	— 0.3	1	2.1	14.6
Iola, Kans.	262	10	10.6	20	— 0.3	1, 2, 4, 5	2.0	10.9
Oswego, Kans.	184	20	19.0	18	0.3	1-3	6.1	18.7
Fort Gibson, Ind. T.	3	22	16.4	20, 21	10.0	3, 4	13.1	6.4
Canadian River.								
Calvin, Ind. T.	99	10	4.7	12	1.9	7	2.7	2.8
Black River.								
Blackrock, Ark.	67	12	7.8	22, 23	3.6	19	5.2	4.2
White River.								
Calicorock, Ark.	272	15	6.5	23	1.3	9	3.0	5.2
Batesville, Ark.	217	18	8.4	23	3.5	7-9	5.0	4.9
Newport, Ark.	185	26	10.8	24	3.8	8, 9	6.0	7.0
Clarendon, Ark.	75	30	22.3	1	13.6	12	16.4	8.7
Arkansas River.								
Pueblo, Colo.	1,334	10						
Wichita, Kans.	832	10	2.4	13	0.0	30	0.9	2.4
Tulsa, Ind. T.	551	16	5.6	24	2.5	5, 6	3.5	3.1
Webbers Falls, Ind. T.	465	23	11.6	20	4.6	5, 6	7.8	7.0
Fort Smith, Ark.	403	22	12.7	21	4.6	6-8	8.6	8.1
Dardanelle, Ark.	256	21	12.6	22	3.6	7	8.2	9.0
Little Rock, Ark.	176	23	13.2	23	4.9	8, 9	9.1	8.3
Yazoo River.								
Greenwood, Miss.	175	38	3.9	4	1.3	30	2.8	2.6
Yazoo City, Miss (1).	80	25	3.5	1	— 0.4	28	0.9	3.9
Little River.								
Whitecliffs, Ark.	33	20	3.5	18	1.3	11, 12	1.7	2.2
Ouachita River.								
Camden, Ark.	304	39	9.7	15	4.0	9	5.8	5.7
Monroe, La (2).	122	40	22.3	1	3.8	27	11.2	18.5
Red River.								
Arthur City, Tex.	688	27	13.3	14	5.5	7-10	7.6	7.8
Fulton, Ark.	515	28	14.0	17	8.0	11-15	9.6	6.0
Springbank, Ark.	441	29						
Shreveport, La.	327	29	6.3	1, 20, 21	1.5	17, 18	3.8	4.8
Alexandria, La.	118	33	13.2	1	4.4	21	7.4	8.8
Mississippi River.								
St. Cloud, Minn.	2,034	4	1.8	21, 22	1.3	{11-14, 16-18, 30}	1.5	0.5
St. Paul, Minn.	1,954	14	7.4	21	5.4	14	6.2	2.0
Red Wing, Minn.	1,914	14	7.1	25, 26	4.2	13-15	5.1	2.9
Reeds Landing, Minn.	1,884	12	6.5	25	3.8	14	4.8	2.7
La Crosse, Wis.	1,819	12	7.6	27, 28	5.0	15, 16	6.0	2.6
Prairie du Chien, Wis.	1,759	18	7.9	30	5.3	17, 18	6.4	2.6
Dubuque, Iowa.	1,699	18	8.2	30	5.7	17, 18	6.8	2.5
Clinton, Iowa.	1,629	16	7.8	3	5.3	16-20	6.2	2.5
Leclaire, Iowa.	1,609	10	5.6	3	3.7	17-20	4.4	1.9
Davenport, Iowa.	1,593	15	7.0	3	4.8	17-20	5.6	2.2
Muscatine, Iowa.	1,562	16	8.1	4	5.6	18-20	6.5	2.5
Galland, Iowa.	1,472	8	3.7	5, 6	2.5	20, 21	3.0	1.2
Keokuk, Iowa.	1,463	15	6.5	6	4.5	18	5.2	2.0

TABLE VI.—*Heights of rivers referred to zeros of gages*—Continued.

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Mississippi River—Cont'd.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Warsaw, Ill.	1,458	18	9.1	5,6	7.6	16–19	8.1	1.5
Hannibal, Mo	1,402	13	7.2	6,7	5.6	28,29	6.2	1.6
Grafton, Ill	1,306	23	16.4	21	7.6	30	9.9	8.8
St. Louis, Mo	1,264	30	30.2	21	10.1	6	16.9	20.1
Chester, Ill	1,189	30	26.6	22,23	9.2	7–11	14.9	17.4
New Madrid, Mo.	1,003	34	25.0	25	11.3	13,14	16.3	13.7
Luxora, Ark	905	33	18.7	26,27	5.8	12,13	11.3	12.9
Memphis, Tenn	843	33	21.6	26,27	7.6	16	12.7	14.0
Helena, Ark.	767	42	28.5	28	12.3	16,17	18.2	16.2
Arkansas City, Ark.	635	42	31.8	29,30	16.2	15	22.1	15.6
Greenville, Miss	595	42	26.3	30	13.0	15,16	17.8	13.3
Vicksburg, Miss	474	45	27.3	30	13.4	17	18.8	13.9
Natchez, Miss.	373	46	27.4	30	16.5	18,19	21.1	10.9
Baton Rouge, La. (4)	240	35	19.0	4,5	9.5	22	13.8	9.5
Donaldsonville, La	188	28	14.2	4–6	6.9	20	10.3	7.3
New Orleans, La.	108	16	9.8	5,6	5.4	21	7.4	4.4
Atchafalaya River.								
Simmesport, La.	127	33	23.9	4	12.3	22	17.5	11.6
Melville, La.	103	31	26.3	3,4	16.2	20–22	20.9	10.1
Morgan City, La	19	8	5.2	28	4.0	{2,5,14,15,19,21,23,27}	4.5	1.2
Grand River.								
Grand Rapids	38	11	2.8	21	1.5	1,13	1.9	1.3
Connecticut River.								
Hartford, Conn.	50	13	13.4	6	3.5	1	7.1	9.9
Mohawk River.								
Tribeshill, N. Y.	42	12	6.5	5	0.5	28–30	2.0	6.0
Schenectady, N. Y.	19	15	8.8	5	1.0	30	2.9	7.8
Hudson River.								
Troy, N. Y.	154	14	6.0	7	3.9	1, 18, 29, 30	4.6	2.1
Albany, N. Y.	147	12	9.4	6	3.2	26	5.2	6.2
Pompton River.								
Pompton Plains, N. J.	6	8	4.9	12	3.6	1,2	4.2	1.3
Passaic River.								
Chatham, N. J	69	7	5.0	5	2.3	1,2	3.2	2.7
Lehigh River.								
Mauchchunk, Pa	45	15	6.7	12	4.5	27	4.9	2.4
Schuylkill River.								
Reading, Pa.	66	12	5.5	4	0.2	28–30	1.0	5.3
Delaware River.								
Hancock (E. Branch), N. Y.	269	12	5.3	5	3.4	30	4.1	1.9
Hancock (W. Branch), N. Y.	269	10	5.9	21	3.5	30	4.2	2.4
Port Jervis, N. Y.	204	14	3.9	13	0.9	30	1.9	3.0
Phillipsburg, N. J.	142	26	7.9	.5	0.7	2	3.7	7.2
Trenton, N. J.	92	18	4.7	5	1.1	2	2.8	3.6
North Branch Susquehanna.								
Binghamton, N. Y	183	16	10.5	6	2.6	30	4.6	7.9
Towanda, Pa.	139	16	7.9	6	1.0	1	3.2	6.9
Wilkes-Barre, Pa.	80	17	11.9	7	3.3	1	6.4	8.6
West Branch Susquehanna.								
Williamsport, Pa.	39	20	3.5	14	0.8	30	1.7	2.7
Juniata River.								
Huntingdon, Pa.	90	24	4.7	12	3.1	27–30	3.4	1.6
Susquehanna River.								
Harrisburg, Pa.	69	17	4.9	8	1.8	1–3	3.1	3.1
Shenandoah River.								
Riverton, Va.	58	22	0.5	1–30	0.5	1–30	0.5	0.0
Potomac River.								
Cumberland, Md.	290	8	3.2	12	1.8	30	2.4	1.4
Harpers Ferry, W. Va.	172	18	1.8	14	— 0.6	25–27	0.5	2.4
James River.								
Buchanan, Va.	305	12	3.6	3	1.9	25–30	2.2	1.7
Lynchburg, Va.	260	18	1.9	3	0.3	25–30	0.7	1.6
Columbia, Va.	167	18	8.0	3	2.4	17	3.7	5.6
Richmond, Va.	111	12	3.1	3	— 0.4	29	0.4	3.5
Roanoke River.								
Clarksville, Va	196	12	5.9	4	— 0.6	30	0.4	6.5
Weldon, N. C.	129	30	25.1	5	8.5	27–30	10.3	16.6
Tar River.								
Tarboro, N. C.	46	25	8.1	6	1.8	30	3.9	6.3
Greenville, N. C.	21	22	9.2	7	3.8	28–30	5.5	5.4
Haw River.								
Moncure, N. C.	171	25	6.0	4	0.7	19,27	1.8	5.3
Cape Fear River.								
Fayetteville, N. C	112	38	17.2	6	2.9	30	6.4	14.3
Waccamaw River.								
Conway, S. C.	40	7	3.2	1	1.6	12–14	2.4	1.6
Pedee River.								
Cheraw, S. C	149	27	4.1	8	1.7	29,30	2.2	2.4
Smiths Mills, S. C.	51	16	10.8	1	3.0	15,30	5.5	7.8
Lynch Creek.								
Effingham, S. C.	35	12	9.5	18	3.2	13,30	5.8	6.3
Black River.								
Kingstree, S. C.	45	12	3.7	6	1.9	16	2.6	1.8
Catawba River.								
Mount Holly, N. C	28	15	2.0	3,4	1.5	17-20,28-30	6.6	0.5
Wateree River.								
Camden, S. C.	37	24	8.2	5	4.5	25	5.6	3.7
Broad River.								
Blairs, S. C.	36	14	2.1	14	0.2	28	0.8	1.9
Saluda River.								
Chappels, S. C.	56	14	5.6	4	0.7	26	1.9	4.9
Congaree River.								
Columbia, S. C	52	15	2.0	5	0.8	27	1.3	1.2
Santee River.								
St. Stephens, S. C.	50	12	8.2	1–3	0.0	29,30	3.7	8.2

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Edisto River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Edisto, S. C.	75	6	2.6	4	0.0	11-14,24-30	1.0	2.6
Broad River.								
Carlton, Ga.	30	11	3.0	2	1.4	24–30	1.7	1.6
Savannah River.								
Calhoun Falls, S. C.	347	15	4.0	4	1.5	30	2.5	2.5
Augusta, Ga.	268	32	9.5	4	4.8	26, 29, 30	6.2	4.7
Oconee River.								
Milledgeville, Ga.	147	25	5.4	2	0.1	28	1.2	5.3
Dublin, Ga	79	30	2.8	4	— 1.2	25–30	—0.4	4.0
Ocmulgee River.								
Macon, Ga.	203	18	2.4	3	— 0.6	24	0.3	3.0
Abbeville, Ga.	96	11	4.3	7	0.0	25–30	1.1	4.3
Flint River.								
Woodbury, Ga.	227	10	0.6	4,5	— 0.5	25, 26	—1.2	1.1
Montezuma, Ga.	152	20	4.6	3	1.0	27	1.8	3.6
Albany, Ga.	90	20	2.5	5	— 0.4	28	0.5	2.9
Bainbridge, Ga	29	22	4.1	6	1.9	28	2.6	2.2
Chattahoochee River.								
Oakdale, Ga	305	18	3.4	4	0.3	29	1.4	3.1
West Point, Ga.	239	20	2.9	5	1.3	22-24,27-29	1.4	1.6
Eufaula, Ala	90	40	4.0	6	— 1.0	24–28	0.8	5.0
Alaga, Ala (1)	30	25	4.1	7	0.7	27	1.8	3.4
Coosa River.								
Rome, Ga.	271	30	3.7	13	0.1	28–30	1.0	3.6
Gadsden, Ala.	144	22	2.1	5	— 0.2	27–30	0.4	2.3
Lock No. 4, Ala.	116	17	1.8	6	0.0	27–30	0.6	1.8
Wetumpka, Ala	6	45	3.6	7	0.5	30	1.9	3.1
Tallapoosa River.								
Milstead, Ala.	38	35	2.2	5	0.3	27, 30	1.0	1.9
Alabama River.								
Montgomery, Ala.	265	35	1.2	1,8	— 0.8	26, 28	0.3	2.0
Selma, Ala	212	35	2.4	1,2	— 1.4	28–30	0.3	3.8
Black Warrior River.								
Tuscaloosa, Ala.	90	43	18.0	5	4.9	29, 30	7.3	13.1
Tombigbee River.								
Columbus, Miss	303	33	— 1.6	12, 22	— 2.9	6	—2.2	1.3
Vienna, Ala.	233	42	5.2	3	2.7	19	4.1	2.5
Demopolis, Ala.	155	35	8.5	7	— 0.8	30	2.7	9.3
Leaf River.								
Hattiesburg, Miss.	60	20	4.2	15	2.8	5, 6, 10, 11	3.4	1.4
Chickasawhay River.								
Enterprise, Miss	144	18	2.3	1,4	1.2	{19, 20, 22 / 23, 27, 28}	1.2	1.1
Shubuta, Miss.	106	25	5.5	1	1.2	28–30	2.6	4.3
Pascagoula River.								
Merrill, Miss.	78	20	5.2	1	1.2	29, 30	2.3	4.0
Pearl River.								
Jackson, Miss	242	20	5.7	1	1.1	30	2.2	4.6
Columbia, Miss.	110	14	6.8	14	4.4	26–30	5.3	2.4
Sabine River.								
Logansport, La.	315	25	4.4	4,5	2.3	30	3.0	2.1
Neches River.								
Rockland, Tex	105	20	1.6	5	0.1	26–30	0.5	1.5
Beaumont, Tex.	18	10	2.1	19	1.4	5	1.6	0.7
Trinity River.								
Dallas, Tex.	320	25	6.6	17	3.0	7, 27, 28	4.0	3.6
Long Lake, Tex.	211	35	6.2	23	1.9	17, 18	3.1	4.3
Riverside, Tex.	112	40	2.7	1	0.5	19	1.2	2.2
Liberty, Tex	20	25	8.9	5,6	4.7	24–26	6.0	4.2
Brazos River.								
Kopperl, Tex.	345	21	5.2	17	— 0.2	26–30	0.9	5.4
Waco, Tex.	285	24	9.0	14	2.8	12	4.5	6.2
Valley Junction, Tex.	215	40	8.8	15	1.0	9	3.5	7.8
Hempstead, Tex	140	40	10.3	17	1.4	13, 14	3.8	8.9
Booth, Tex	61	39	6.7	23	4.4	15,16,28-30	5.0	2.3
Colorado River.								
Ballinger, Tex.	489	21	7.5	12	1.0	6, 7, 25–28	2.2	6.5
Austin, Tex.	214	18	3.1	20	0.8	1	1.6	2.3
Columbus, Tex.	98	24	8.4	25	6.6	15–21	7.1	1.8
Guadalupe River.								
Gonzales, Tex.	112	22	1.1	9,14–16	0.7	3, 4, 17	0.9	0.4
Victoria, Tex	35	16	2.1	4	1.3	18, 25	1.7	0.8
Rio Grande River.								
El Paso, Tex.	1,030	14						
San Marcial, N. Mex (2)	1,233	11	8.1	27	5.4	14	6.6	2.7
Red River of the North.								
Moorhead, Minn.	284	26	10.0	1,2	9.3	15–18	9.7	0.7
Kootenai River.								
Bonners Ferry, Idaho.	123	24	3.1	1	1.5	22	2.3	1.6
Pend d'Oreille River.								
Newport, Wash.	86	14	— 0.5	1,2	— 1.4	20	—1.0	0.9
Snake River.								
Lewiston, Idaho	144	24	0.5	30	— 0.3	5–12	—0.2	0.8
Riparia, Wash.	67	30	1.1	30	0.3	1–8, 10–13	0.5	0.8
Columbia River.								
Wenatchee, Wash	473	40	11.0	1	8.0	20, 21	9.1	3.0
Umatilla, Oreg.	270	25	4.6	1	2.7	25, 26	3.3	1.9
The Dalles, Oreg.	166	40	6.2	1	1.9	25	3.8	4.3
Willamette River.								
Albany, Oreg.	118	20	1.0	29, 30	0.5	1–25	0.6	0.5
Salem, Oreg	84	20	0.7	29, 30	— 0.1	1–13, 22–26	0.0	0.8
Portland, Oreg.	12	15	4.7	29	1.2	21	2.9	3.5
Sacramento River.								
Red Bluff, Cal.	201	23	0.3	4-14,27-30	0.2	1-3,15-26	0.2	0.1
Sacramento, Cal.	64	25	7.0	1	6.3	20–22	6.6	0.7

(1) For 28 days. (2) For 15 days. (3) For 27 days. (4) For 26 days.

Honolulu, T. H., latitude, 21° 19′ north, longitude 157° 52′ west; barometer above sea, 38 feet; gravity correction, —.057 applied. September, 1905.

Day.	Pressure.*		Air temperature.				Moisture.				Wind.				Precipitation.		Clouds.					
							8 a. m.		8 p. m.		8 a. m.		8 p. m.				8 a. m.			8 p. m.		
	8 a. m.	8 p. m.	8 a. m.	8 p. m.	Maximum.	Minimum.	Wet.	Relative humidity.	Wet.	Relative humidity.	Direction.	Velocity.	Direction.	Velocity.	8 a. m.	8 p. m.	Amount.	Kind.	Direction.	Amount.	Kind.	Direction.
1	30.01	29.99	77.4	75.5	81	70	70.2	70	68.2	69	ne.	4	se.	3	0.01	0.00	3 5	Cu. S.-cu.	e. e.	2	S.-cu.	e.
2	29.98	29.99	77.2	75.3	82	73	68.4	64	68.2	70	s.	8	ne.	5	0.00	0.00	1	Cu.	e.	few.	Cu.	e.
3	30.00	30.00	78.2	76.0	83	70	69.0	63	70.0	74	ne.	4	e.	5	0.00	0.00	1	Cu.	e.	few.	Cu.	ne.
4	30.01	30.03	76.1	71.4	82	70	70.6	76	70.9	98	e.	2	e.	8	T.	0.20	1 8	Cu. S.-cu.	se. se.	10	N.	?
5	30.04	30.02	80.2	77.9	83	74	71.2	64	68.5	62	ne.	8	e.	6	0.09	T.	1	Cu.	e.	3	Cu.	e.
6	30.06	29.96	77.3	75.8	82	73	68.8	65	69.3	72	ne.	6	ne.	12	T.	T.	4 2	Cu. S.-cu.	e. e.	1	S.-cu.	e.
7	30.00	29.94	76.7	76.0	81	73	70.5	63	71.7	81	ne.	17	e.	9	T.	0.04	7 2	S.-cu. N.	e. e.	10	N.	?
8	29.94	29.93	79.5	78.0	82	74	73.0	74	69.0	63	e.	4	ne.	9	0.14	T.	5 3	Cu. S.-cu.	e. e.	6 2	Ci.-s. S.-cu.	w. e.
9	29.94	29.91	77.0	77.0	84	73	73.8	86	74.9	91	ne.	14	sw.	11	0.01	0.15	7 2	Ci.-s. Cu.	w. e.	9	S.-cu.	nw.
10	30.00	30.02	78.1	77.3	83	72	74.6	85	72.3	79	se.	9	ne.	3	0.20	0.01	3 2	Cu. S.-cu.	se. se.	7 1	Ci.-s. S.-cu.	w. se.
11	30.01	29.99	78.9	76.3	84	74	72.3	73	69.2	70	e.	5	ne.	4	0.00	0.00	1	S.-cu.	e.	1	Cu.	e.
12	29.97	29.95	78.0	75.7	82	70	69.6	65	68.0	67	ne.	3	ne.	4	T.	0.00	2 1	Cu. S.-cu.	e. e.	1	S.-cu.	e.
13	29.98	30.00	78.7	76.5	84	73	70.0	65	68.0	64	e.	9	ne.	4	0.00	T.	2 2	Ci.-s. S.-cu.	w. e.	3	S.-cu.	e.
14	30.03	29.99	76.5	76.2	81	73	68.9	68	67.9	65	ne.	8	ne.	13	T.	0.00	7	S.-cu.	e.	1	S.-cu.	e.
15	29.98	29.92	77.9	75.4	82	74	70.2	68	69.4	74	ne.	11	ne.	13	0.02	0.01	1 2	Ci.-s. S.-cu.	o. e.	2	S.-cu.	e.
16	29.96	29.96	78.4	76.6	82	71	70.9	69	69.6	71	e.	11	e.	12	T.	0.01	7	S.-cu.	e.	9	N.	?
17	30.03	30.01	75.4	76.5	79	72	70.4	78	69.0	68	e.	10	ne.	11	0.01	0.19	1 8	S.-cu. N.	e. e.	1	S.-cu.	?
18	30.02	30.01	76.5	75.0	81	74	69.1	69	68.0	70	ne.	12	ne.	16	0.00	0.00	few.	Cu.	e.	few.	S.-cu.	?
19	30.03	30.00	75.3	75.5	81	72	67.4	66	66.3	61	ne.	11	ne.	9	0.01	T.	1 7	Cu. S.-cu.	e. e.	3	S.-cu.	e.
20	29.99	29.97	77.0	76.1	81	69	68.8	66	68.0	66	e.	3	ne.	8	0.07	0.01	2 4	Cu. S.-cu.	e. e.	6	S.-cu.	e.
21	30.01	29.99	76.5	75.6	81	72	70.0	72	67.5	66	ne.	7	ne.	4	T.	T.	7	S.-cu.	e.	4	S.-cu.	e.
22	30.00	29.98	75.5	75.0	80	68	69.0	72	67.4	68	ne.	3	ne.	6	0.04	0.08	9	S.-cu.	e.	10	S.-cu.	?
23	29.96	29.96	76.5	74.7	81	71	67.9	64	69.2	76	e.	3	e.	9	0.16	0.02	1 6	Cu. S.-cu.	e. e.	4	S.-cu.	e.
24	30.01	30.01	76.2	76.5	81	71	71.1	78	69.5	70	ne.	3	ne.	8	0.05	T.	5 5	S.-cu. N.	e. e.	7	S.-cu.	e.
25	30.04	30.05	77.9	76.5	83	73	69.8	67	68.1	65	ne.	11	e.	6	T.	0.00	1	Cu.	e.	4	Cu.	e.
26	30.07	30.06	74.8	75.4	80	70	69.0	75	69.4	74	e.	10	ne.	15	0.01	0.04	1 5	Cu. S.-cu.	e. e.	9	N.	e.
27	30.07	30.02	74.5	76.4	80	70	70.3	81	67.5	63	ne.	9	ne.	12	0.10	0.01	2 7	S.-cu. N.	ne. ne.	6	S.-cu.	e.
28	30.05	29.98	78.9	76.9	83	73	68.7	59	68.9	67	ne.	12	ne.	7	0.01	T.	1 1	Cu. S.-cu.	e. e.	6	S.-cu.	e.
29	29.95	29.93	79.1	76.4	83	73	70.9	67	69.3	70	ne.	5	se.	4	0.01	T.	2 2	S.-cu. N.	e. e.	2	S.-cu.	e.
30	29.94	29.95	79.2	75.0	80	70	73.2	75	70.0	78	e.	3	ne.	2	0.11	0.00	2 1	Cu. S.-cu.	s. s.	2	S.-cu.	se.
31																						
Mean	29.963	29.984	77.3	75.9	81.7	71.8	70.3	70.6	69.1	71.1	ne.	7.5	ne.	7.9	1.05	0.77	5.4	S.-cu.	e.	4.4	S.-cu.	e.

Observations are made at 8 a. m. and 8 p. m., local standard time, which is that of 157° 30′ west, and is 5h and 30m slower than 75th meridian time. *Pressure values are reduced to sea level and standard gravity.

MEXICAN CLIMATOLOGICAL DATA.

By Señor MANUEL E. PASTRANA, Director of the Central Meteorologic-Magnetic Observatory.

September, 1905.

Stations.	Altitude.	Mean barometer.*	Temperature.			Relative humidity.	Precipitation.	Prevailing direction.	
			Max.	Min.	Mean.			Wind.	Cloud.
	Feet.	*Inches.*	° *F.*	° *F.*	° *F.*	%	*Ins.*		
Aguascalientes (Seminario.)	6,330	.....	.....	.....	.....	.....	3.69	.....	.....
C. Juarez	3,805	26.13	92	64	75.6	74	1.63	e.	.....
Chihuahua	1,663	25.26	88	60	72.1	60	3.00	ese.	.....
Guadalajara (Seminario.)	5,186	.....	.....	.....	.....	.....	.....	.....	.....
Guanajuato	6,720	.....	.....	.....	.....	.....	.....	.....	.....
Hugotitan Hda (Jalasco.)	5,228	24.87	85	52	65.7	80	1.72	se.	.....
Jalapa	4,681	25.50	84	56	67.1	84	6.47	n.	.....
Lampazos	.....	28.75	100	69	82.4	62	1.83	. .....	.....
Leon	5,906	24.30	79	49	67.1	68	6.75	e.	.....
Linares	.....	28.61	100	64	82.6	64	3.19	s.	.....
Maxcami	.....	29.90	92	70	79.7	84	3.59	e.	.....
Merida	.....	29.84	90	71	79.7	82	3.80	.....	.....
Mexico (Obs. Cent.)	7,472	22.91	79	58	61.5	68	1.68	ne.	ne.
Morelia (Seminario)	6,401	23.90	75	48	62.8	71	3.69	....	....
Oaxaca	5,063	24.98	91	52	69.8	65	1.57	w.	.....
Parral	5,674	24.53	83	54	65.8	.....	6.08	e.	.....
Peto	.....	29.79	92	67	78.6	87	6.12	ne.	.....
Puebla (Col. d Est.)	7,118	23.31	77	46	61.3	75	3.36	ene.	.....
Progresso	.....	29.89	89	.....	79.3	86	1.48	e.	....
San Luis Potosi	39	24.10	80	55	63.3	60	1.56	e.	.....
Valladolid (Yucatan)	82	29.84	92	68	77.9	90	7.85	se.	.....
Yzamal	.....	29.87	92	68	78.4	88	7.04	e.	.....
Zacatecas	8,015	22.54	78	45	60.1	66	2.65	e.	.....

*The monthly barometric means are reduced to the international standard of gravity.

RAINFALL IN JAMAICA.

Through the kindness of Mr. H. H. Cousins, chemist to the government of Jamaica and now in charge of the meteorological service of that island, we have received the following table:

Comparative table of rainfall.

[Based upon the average stations only.]

SEPTEMBER, 1905.

Divisions.	Relative area.	Number of stations.	Rainfall.	
			1905.	Average.
	Per cent.		*Inches.*	*Inches.*
Northeastern division	25	26	10.10	8.63
Northern division	22	42	5.47	5.14
West-central division	26	20	9.73	9.69
Southern division	27	35	7.76	6.59
Means	100		8.27	7.51

The rainfall for September was, therefore, above the average for the whole island. The greatest fall, 22.54 inches, occurred at Johnson River Bridge in the northeastern division, while 1.64 inches was recorded at the Public Works Office, Kingston, in the southern division.

• Barkerville

Chart I. Tracks of Centers of High Areas, September, 1905.

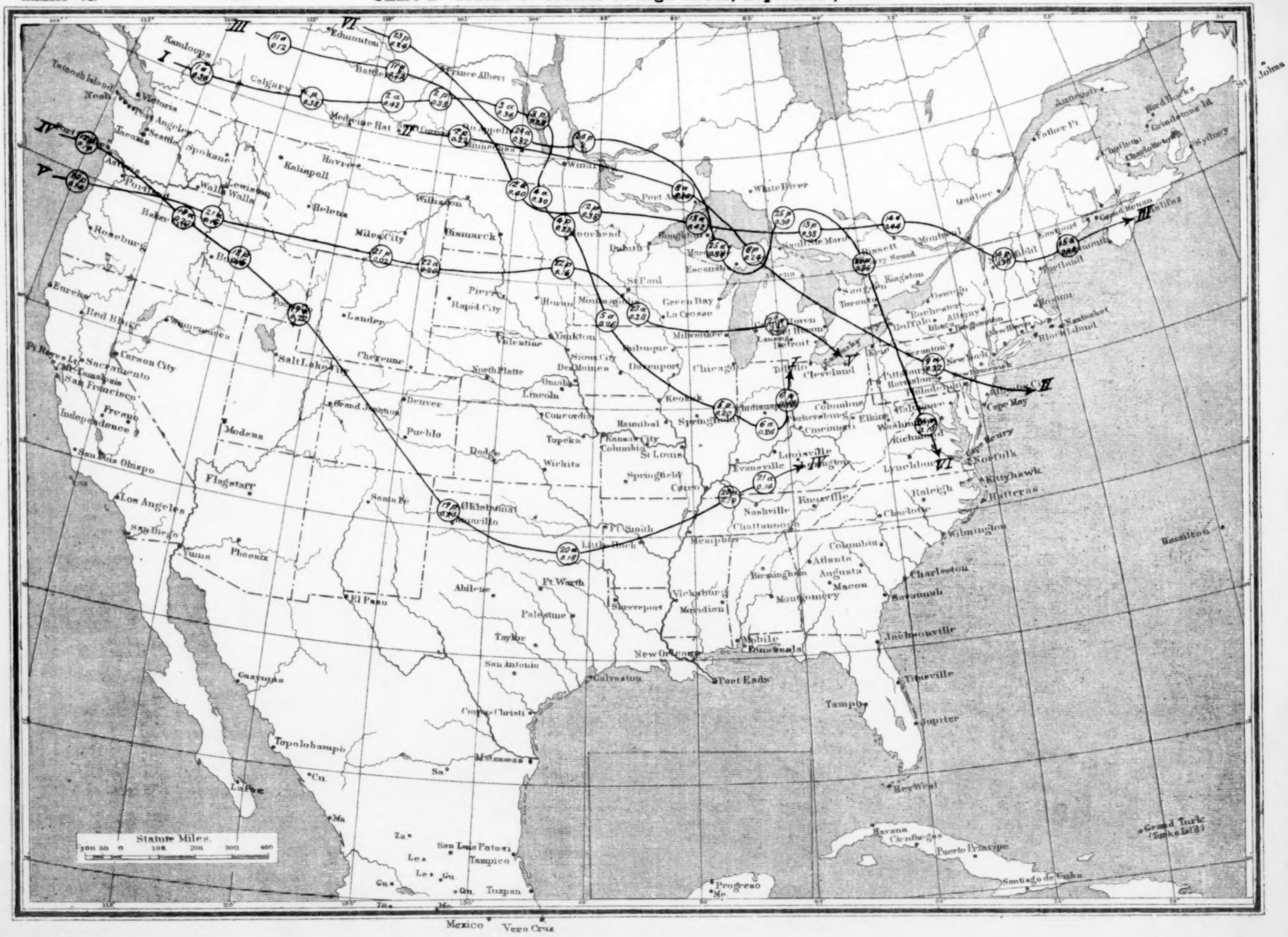

Chart II. Tracks of Centers of Low Areas, September, 1905.

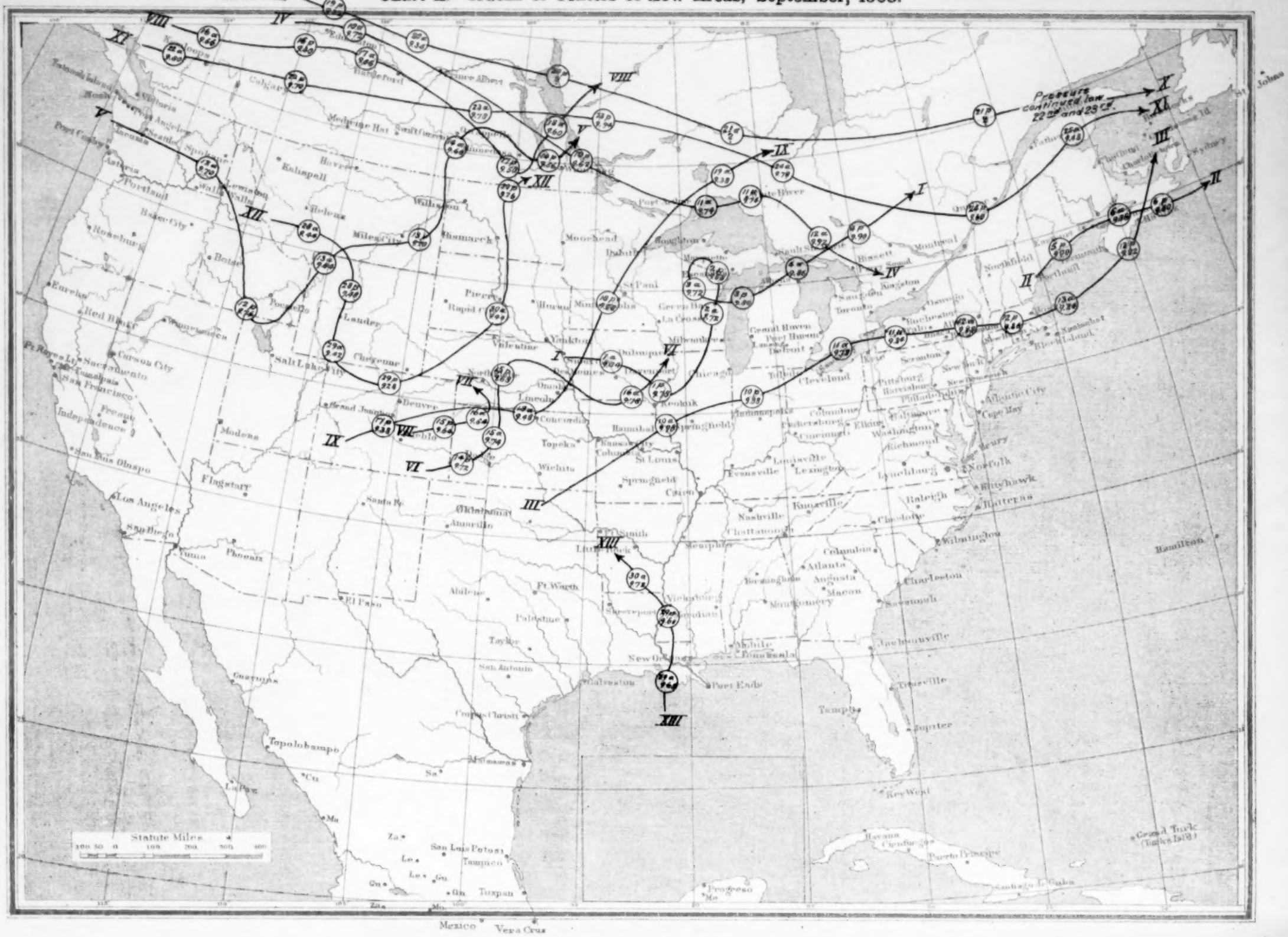

Chart III. Total Precipitation, September, 1905.

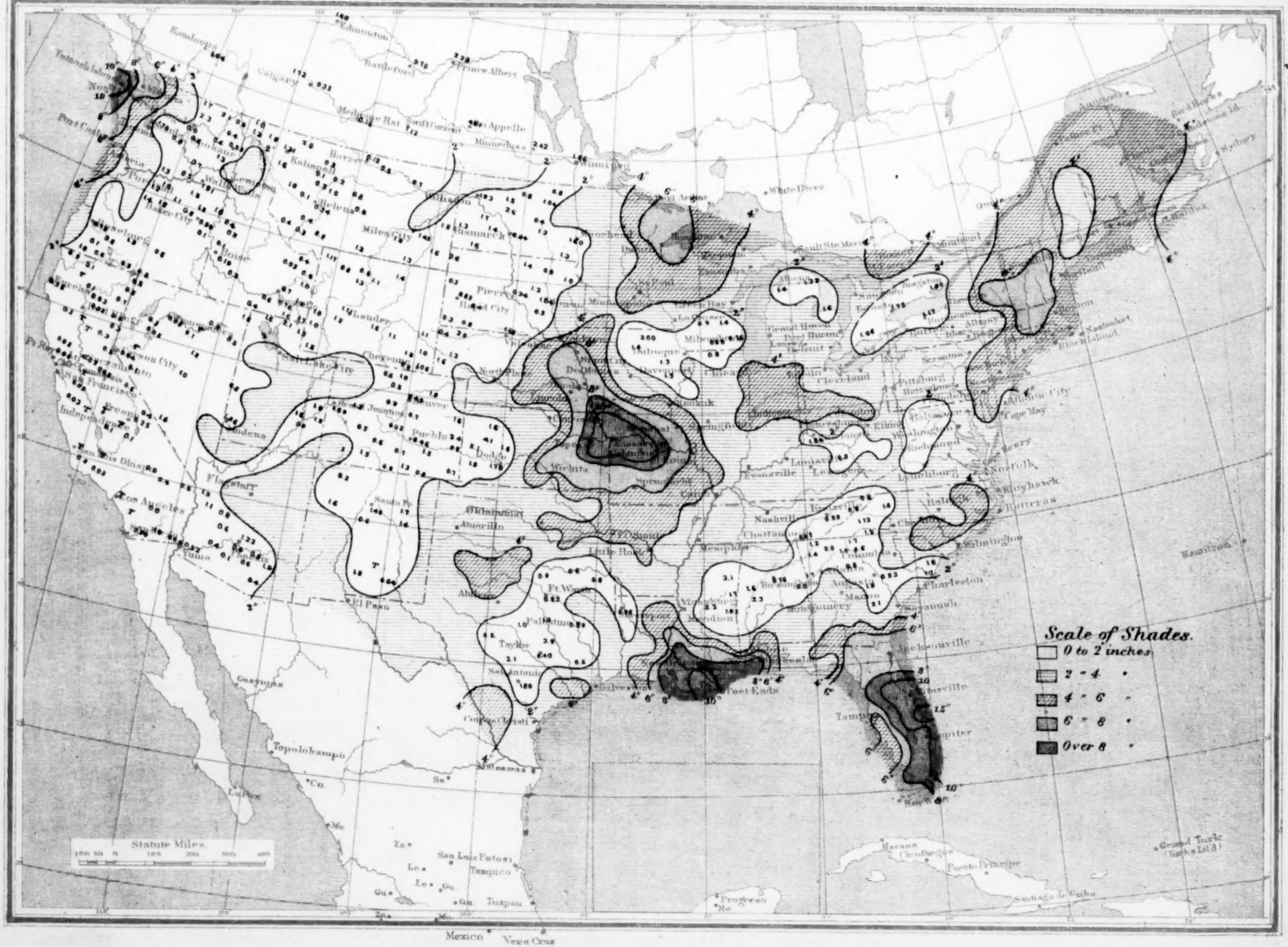

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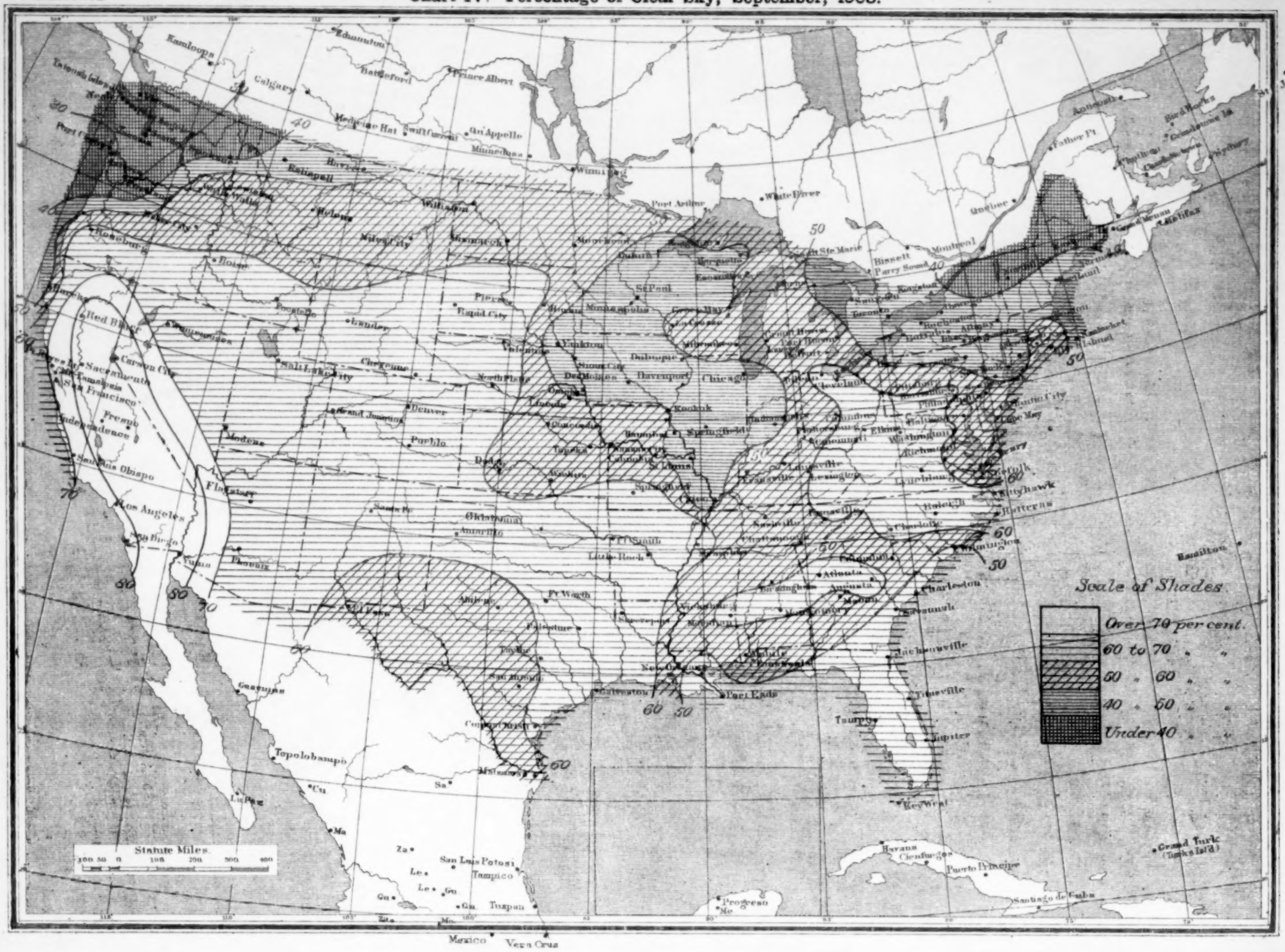
Chart IV. Percentage of Clear Sky, September, 1905.



XXXIII—95. **Chart V. Hydrographs for Seven Principal Rivers of the United States, September, 1905.**

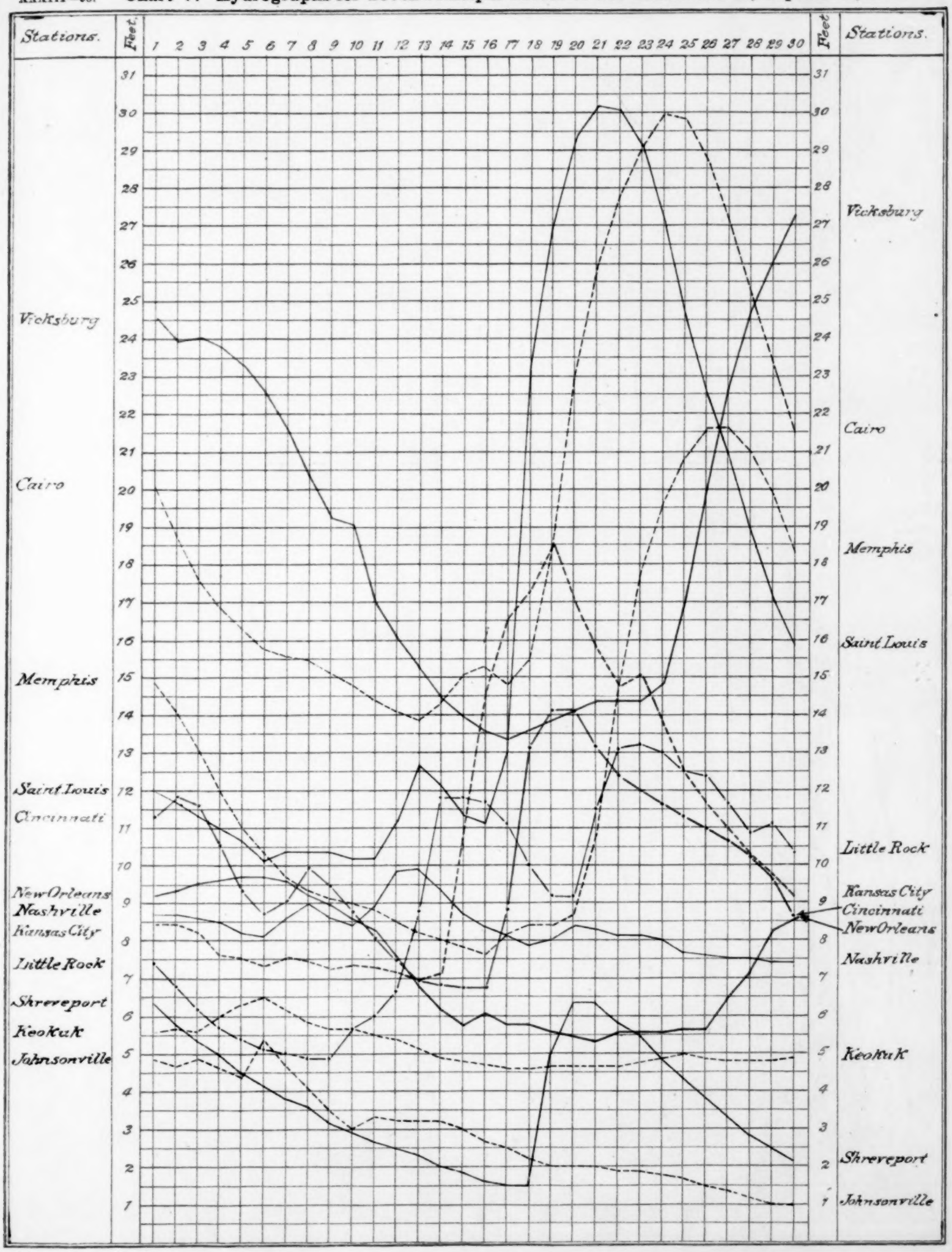

Stations.
Feet.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
Vicksburg
Cairo
Memphis
Saint Louis
Cincinnati
New Orleans
Nashville
Kansas City
Little Rock
Shrereport
Keokuk
Johnsonville

Chart VI. Isobars and Isotherms at 10,000 feet, September, 1905.

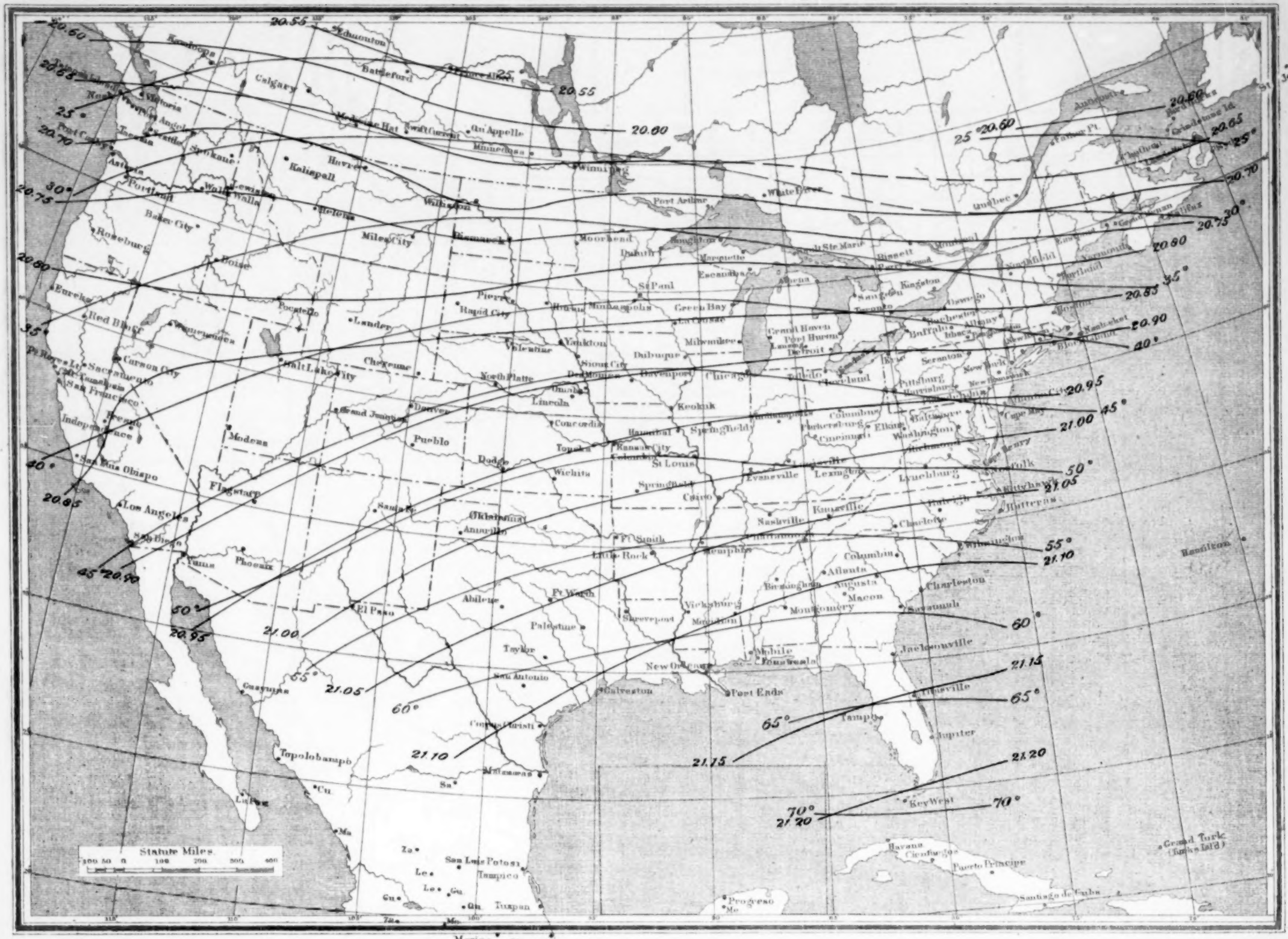


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Chart VII. Isobars and Isotherms at 3500 feet, September, 1905.

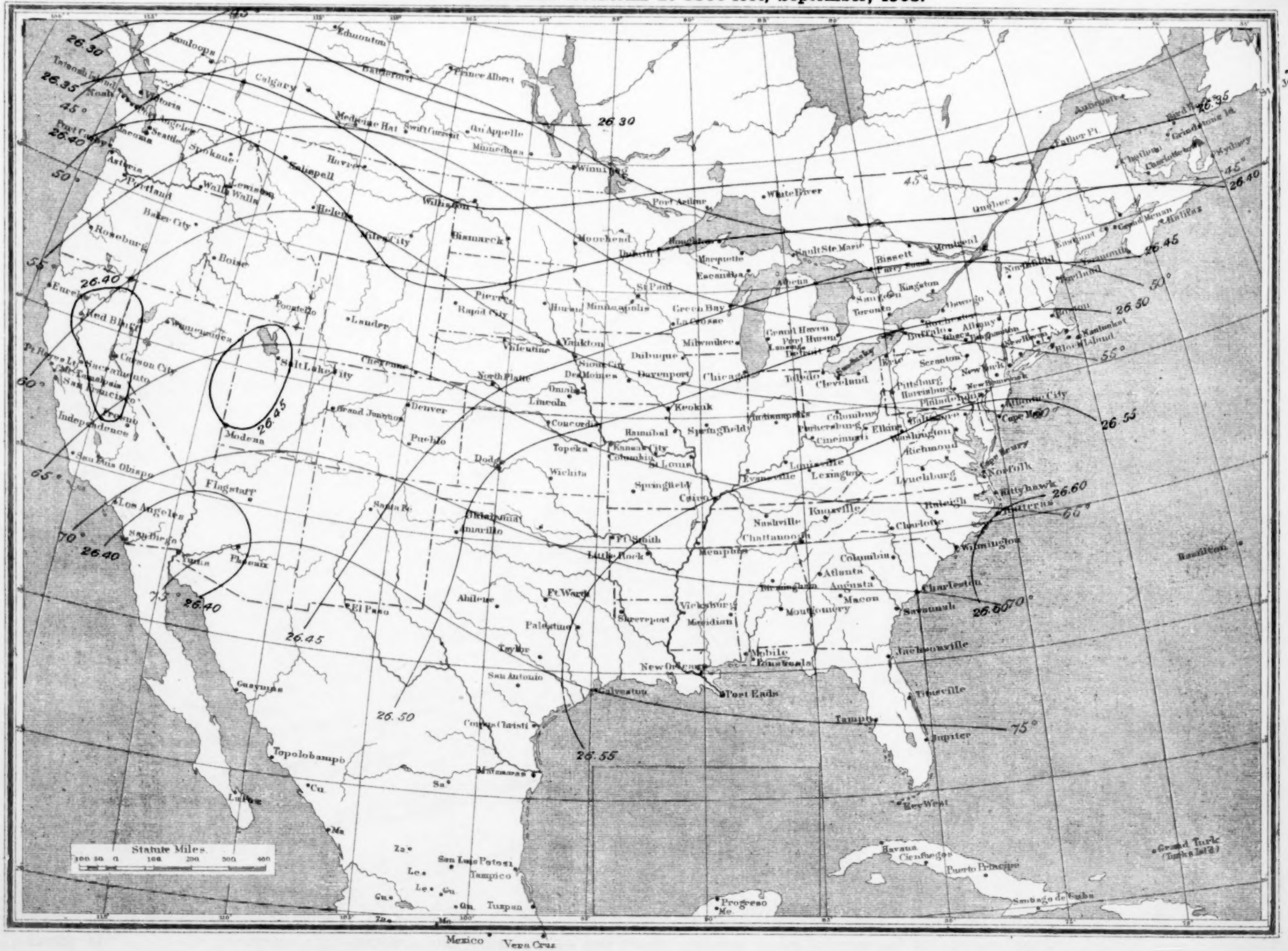

Chart VIII. Isobars and Isotherms at Sea Level; Surface Wind Resultants, September, 1905.

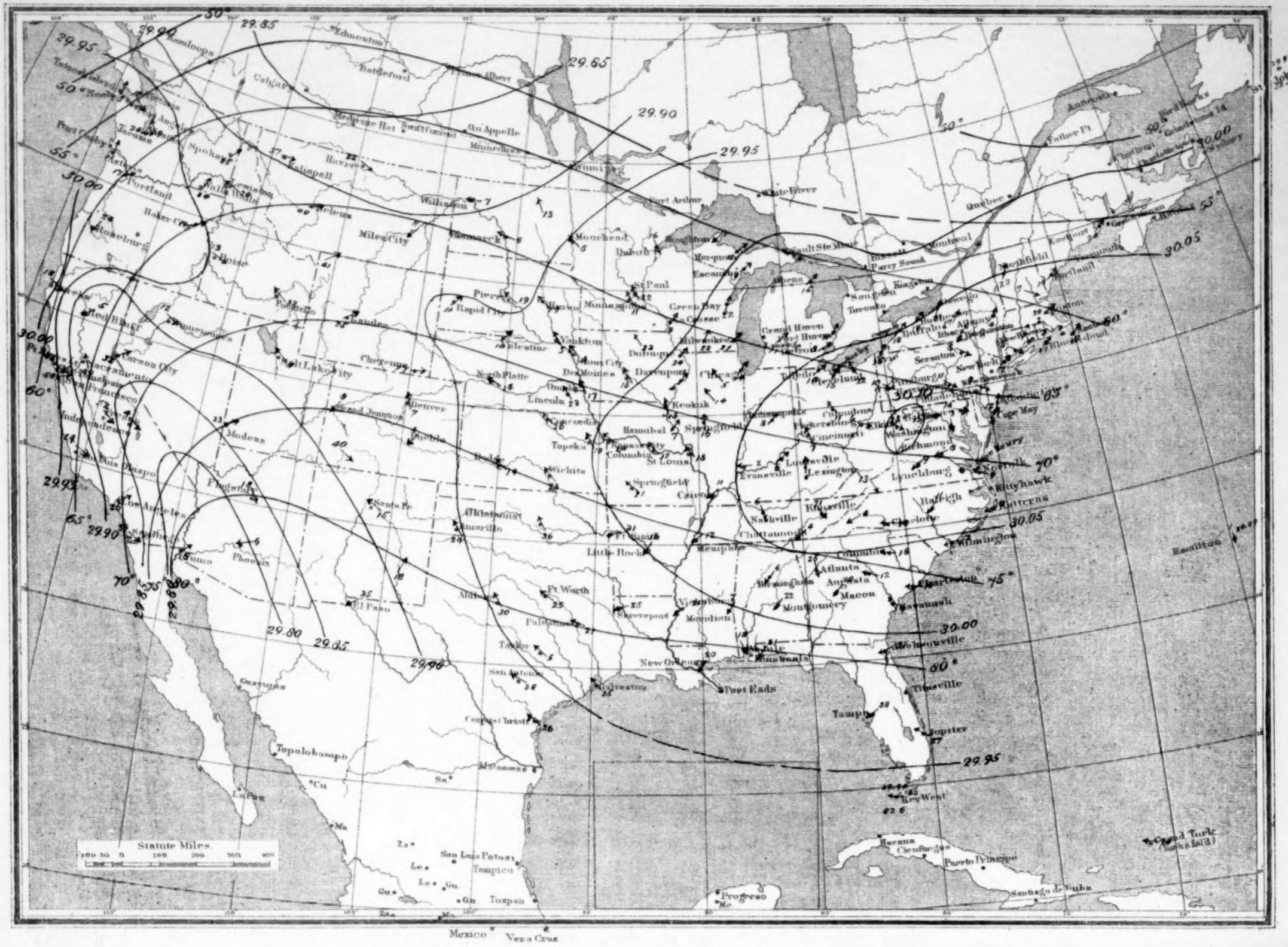

Chart IX. Sea-Level Isobars; Surface Temperatures and Wind Resultants, September, 1905.
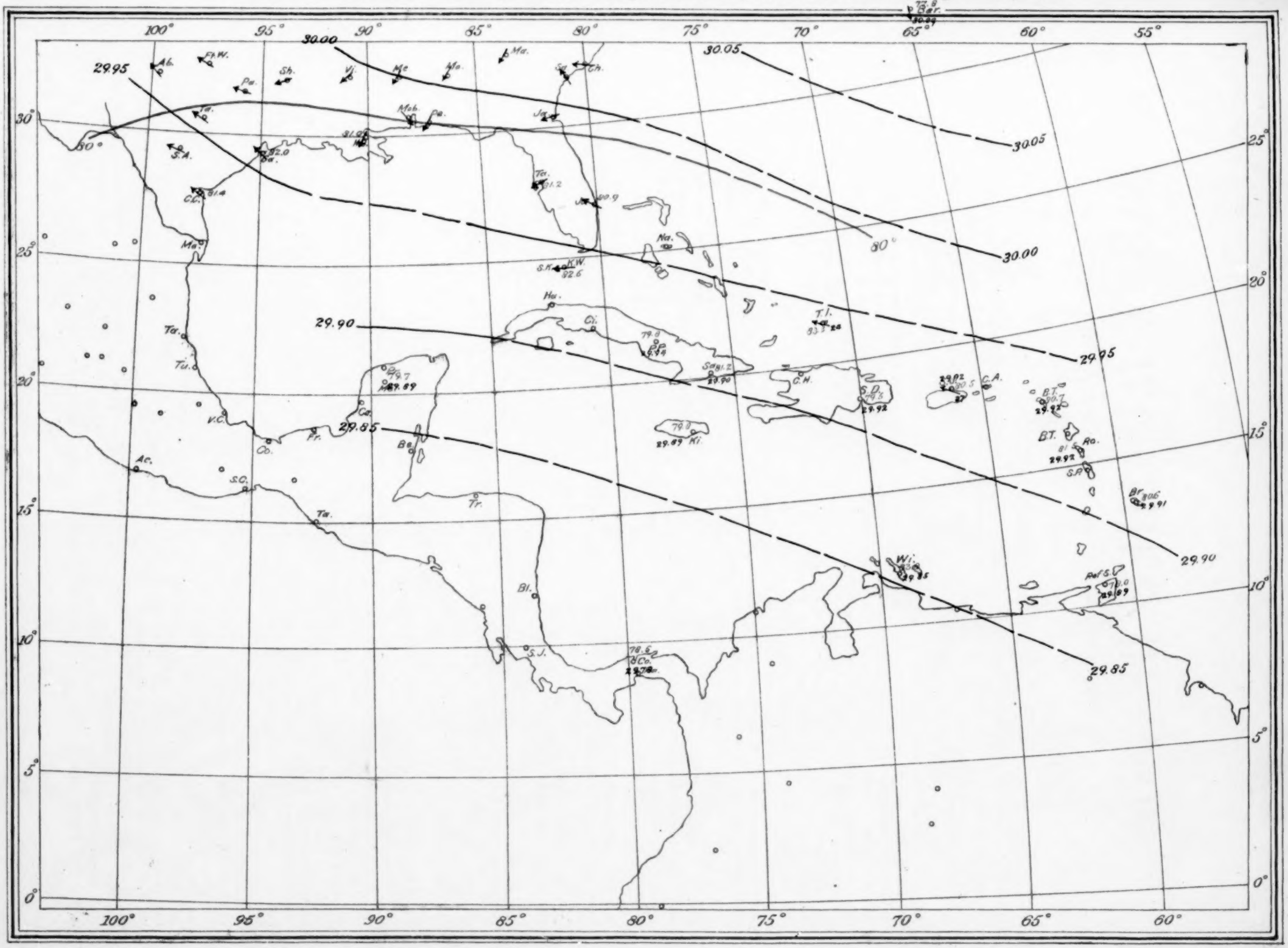
Chart IX. Sea-Level Isobars; Surface Temperatures and Wind Resultants, September, 1905.